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Basic Research Improves

Passenger-Truck Performance

Controlled bolster action, secured by the installation of four-link bolster guides, free swing hangers, lateral-motion hydraulic energy absorbers and elliptic spring covers, has greatly improved car riding qualities

In 1935 a research program was initiated by the Chrysler Corporation, based on its automobile ride developments, and aimed at improving the riding quality of railroad rolling stock. Experimentation has been carried on continuously since that time, both in the laboratory and on the road. The New York Central, the Pennsylvania, and the Pullman Company have actively collaborated with Chrysler in securing marked improvement in riding comfort.

The scope of the development work extends to all fundamental factors affecting the riding performance of rolling stock. An essential part of the program has been to devise new methods for accurately measuring this performance in terms of the vertical and lateral accelerations transmitted to the car body. The successful solution of the instrumentation problem has made it possible not only to evaluate the extent of changes in performance, but to establish a criterion of riding quality.

The results achieved include the development of new passenger car trucks, which combine a notable improvement in passenger comfort with marked reduction in weight. The present article is limited to certain portions of this development, which have been incorporated in a coordinated group of accessory units and are now available for the purpose of rehabilitating standard types of passenger trucks.

At the outset of the experimental road-test program it was recognized that accurate, reliable instrumentation of high sensitivity would be indispensable in properly evaluating the effects of equipment changes. While satisfactory accelerometers were available for counting vertical shocks, a thorough study showed that there was no adequate unit to perform the much more difficult function of accurately integrating the lateral accelerations.

Starting with a Gray contact-type accelerometer with counter recording, a unique set-up was developed which has proved to be sensitive and reliable in measuring lateral accelerations. The accelerometer unit is securely mounted on a pivoted base which acts like a pendulum to neutralize centrifugal forces. This prevents any change in the accelerometer calibration which would otherwise result from rocking of the car body or from the action of centrifugal force on curves. Two such units, each with a separate bank of five counters, are used in a car to obtain the total number of accelerations of five different intensities in both lateral directions.

An important feature of the pendulum-mounted ac-

A drop-equalizer truck equipped with four-link bolster positioning, metallic elliptic spring covers, and variable resistance lateral-motion hydraulic energy absorbers on the bolster

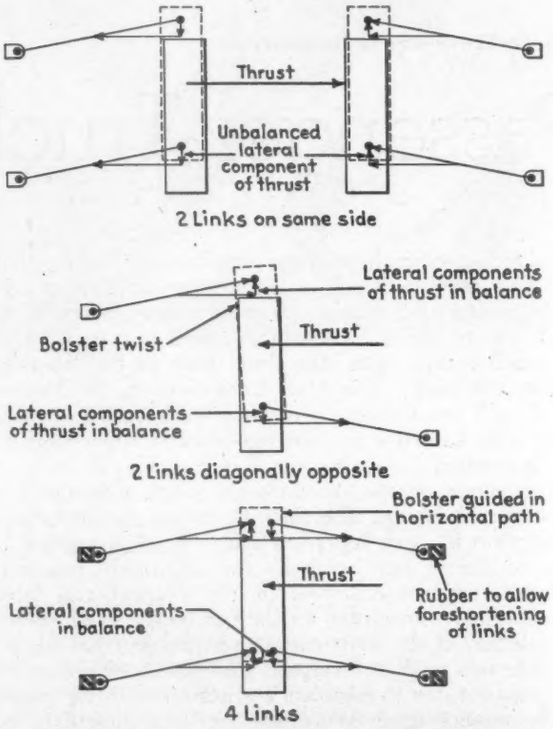
A four-link bolster positioning installation on a triple-bolster truck

celerometer is that the centers of percussion of the accelerometer inertia elements lie on the pivot axis of the swinging platform. This prevents the pendulum action from cushioning the accelerometer against the lateral shocks to be measured. Oil dashpots are employed to dampen the oscillations of the pendulum base.

For measuring vertical accelerations similar accelerometer units are used, secured solidly to the platform casting or the center sill. In this case, the instrument is mounted so that the inertia elements act vertically instead of laterally. Two units are used per car, usually at the truck centers. The accelerometer elements of each unit are calibrated for five different acceleration intensities, which record on separate counters, as in the case of the lateral instruments.

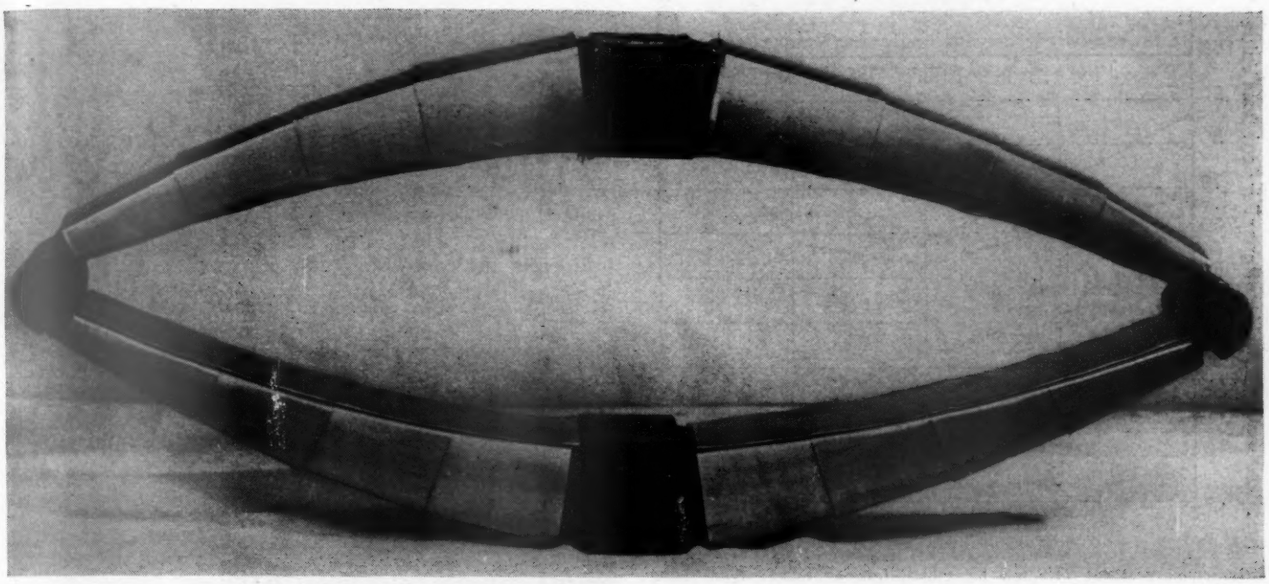
Early in the investigation it was discovered that a free bolster is essential to proper lateral action and further experience proved that any step taken to free the bolster from frictional restraint goes far toward improving the lateral performance, irrespective of the truck type. The swing hangers, when free to move, provide an insulating suspension for keeping out the car body lateral disturbances originating at the rail.

This improvement was effected in two steps. The

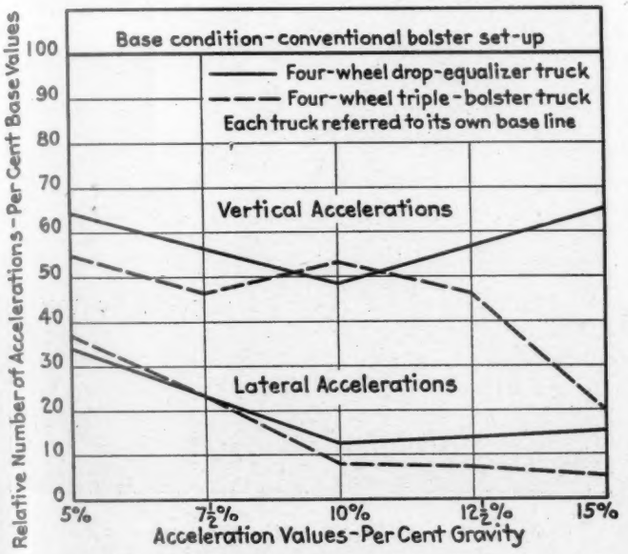


Force diagrams of three arrangements of bolster-positioning links

Applying the metallic telescoping spring covers to an elliptic spring—After the one-piece cover has been snapped in place over the flanges of the telescoping section, the joints are permanently closed by crimping



Telescoping metal spring covers applied to the elliptic springs of a passenger car



The effect of thrust links for positioning passenger-truck bolsters on the riding qualities of the car

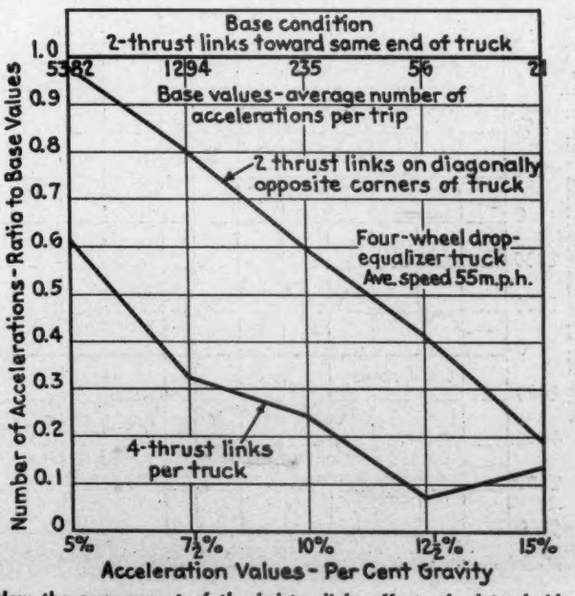
first was the elimination of all friction between the bolster and transoms by the removal of the metallic wear plates and the substitution of four thrust links to guide the vertical and lateral movements of the bolster. In these links, applied on both sides of the bolster, the force components tending to distort the position of the bolster are balanced and both its lateral and vertical movements are uninfluenced by the longitudinal thrust forces transmitted through the links. The second step was the reduction of the friction in the bolster swing-hanger assembly by the substitution of rockers for friction-type bearings.

During the road tests it was found that the vertical riding qualities invariably grew progressively worse as the tests proceeded due to the uncontrolled increase in the friction between the elliptic bolster-spring plates caused by the accumulation of corrosion and dirt. This led to the development of metallic covers for the elliptic springs within which the springs, after having been cleaned, can be kept permanently lubricated.

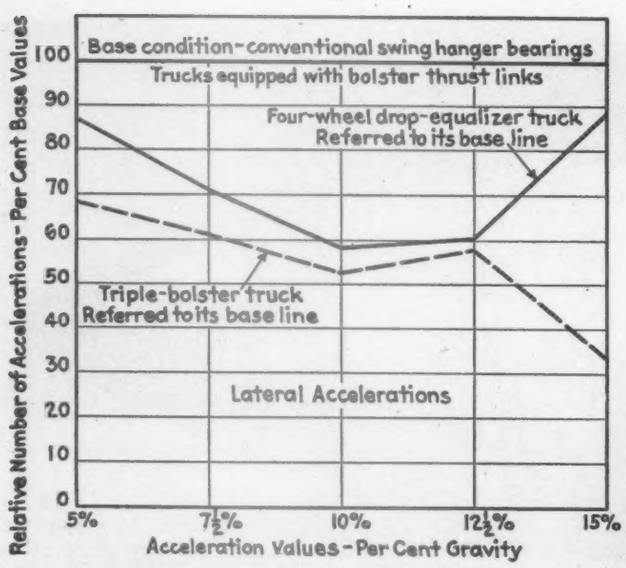
The third improvement was effected by the application of a Houdaille hydraulic energy absorber to cushion large lateral movements of the bolster.

The improvements in riding qualities effected by these changes are presented in a series of graphs showing the reduction in the number of lateral movements recorded at acceleration intensities varying from 5 per cent to 15 per cent of gravity. The installation of four bolster thrust links on a conventional drop-equalizer type of four-wheel truck reduced the number of 5-per-cent gravity shocks 70 per cent, as compared with the same truck equipped with the conventional bolster, and reduced the number of 15-per-cent gravity shocks 85 per cent, as compared with the conventional bolster. Installed on the Pullman triple-bolster type of truck, the improvement in the ride was of about the same order.

While primarily designed for the improvement of lateral action, the thrust links also effected considerable improvement in the vertical action of the bolster by elim-



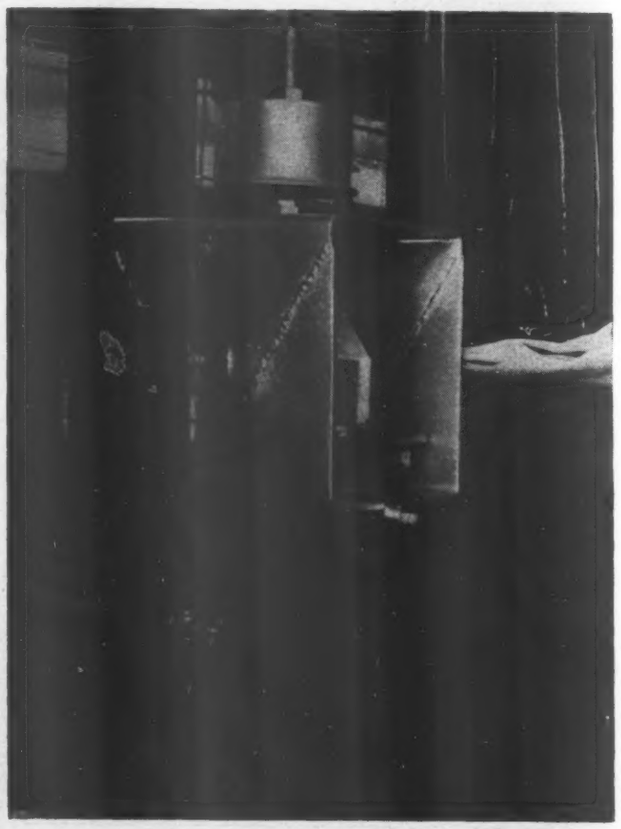
How the arrangement of the bolster links affects the lateral ride of the car



Lateral improvement effected by substitution of rocker type swing hanger for hangers with friction bearings

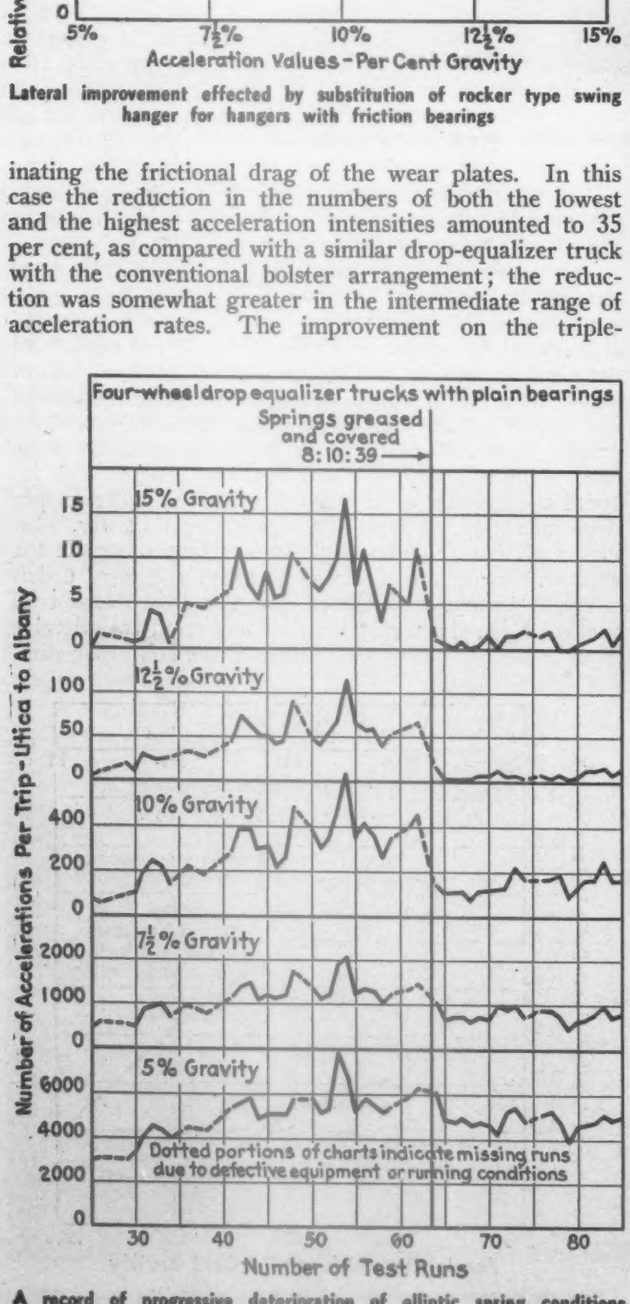
inating the frictional drag of the wear plates. In this case the reduction in the numbers of both the lowest and the highest acceleration intensities amounted to 35 per cent, as compared with a similar drop-equalizer truck with the conventional bolster arrangement; the reduction was somewhat greater in the intermediate range of acceleration rates. The improvement on the triple-bolster truck, particularly in the higher rates of acceleration, was considerably greater.

The effect of spring lubrication is shown in one of the graphs in which the number of shocks per trip at each acceleration intensity are plotted for each trip during an entire series of tests. It will be noted that the number of shocks in which the acceleration reached 15 per cent of gravity, while small, definitely progressed upward after the greasing on April 4, 1939. The springs were again greased and the covers applied on August 10. Following this date the number of shocks dropped and remained fairly constant to the end of the tests. Much



One of the pendulum-mounted lateral accelerometers

the same relative effect is also shown for accelerations of 12½, 10 and 7½ per cent of gravity, respectively. In the case of accelerations of 12½ and 10 per cent of gravity, the reduction following the greasing and covering of the springs amounted to considerably more than 50 per cent. In the case of the accelerations at the rate of 5 per cent of gravity, of which the number is several thousand per trip, the effect of the greasing and covering of the springs was relatively much smaller, probably because the roughness of the old spring plates, used in this test, created a friction threshold high enough to restrain the spring movement at low acceleration rates.



A record of progressive deterioration of elliptic spring conditions following greasing and of the improvement effected by spring covers

Three Arrangements of Bolster Links

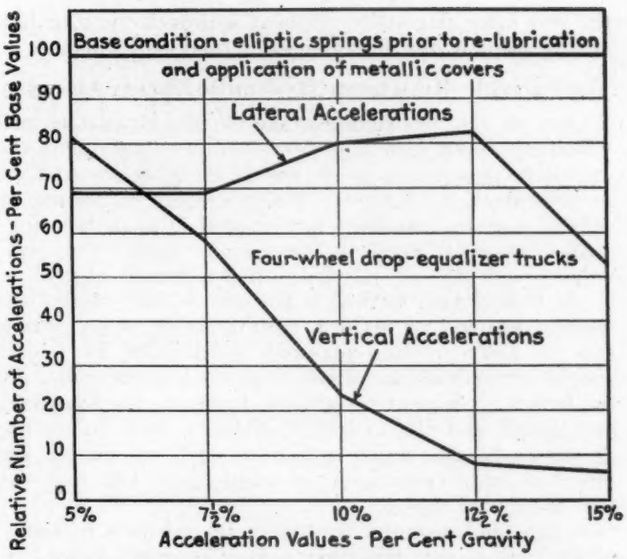
In developing the thrust-link positioning of the bolster three arrangements were tested. In the first, two thrust links were placed toward the same end of the truck, one attached to each end of the bolster and to the truck frame. In the diagram showing the forces in the links resulting from longitudinal thrust applied at the bolster center plate, it will be seen that the lateral components of the forces in the links, which develop when the bolster

is swung to either side of its center position, are unbalanced, tending further to exaggerate the lateral swing of the bolster and prevent it from centering freely.

The second positioning arrangement to be tested utilized two thrust links on diagonally opposite corners of the truck. As shown in the diagram, the lateral components of the link thrust, when the bolster moves to either side of its center position, are in balance but there is a tendency to twist the bolster.

The third and final arrangement to be tested utilized four thrust links on each truck. With this arrangement not only are the lateral components of the thrust through the links balanced when the bolster is swung to either side of its center position, but both the lateral and vertical movements of the bolster are kept in a vertical plane on the transverse center line of the truck. To permit the foreshortening of the links required to accommodate the lateral displacement of the bolster, they are mounted in rubber at the truck-frame attachments. The rubber mountings serve the further purpose of insulating the bolster and car body from the high-frequency vibrations, including those in the sound range, which otherwise would be transmitted from the truck frames through the links. The links are tubular in form with universal joints welded on the ends, to permit full freedom of bolster action. The joints are of the heavy-duty automotive type produced in quantity for use in truck drive shafts. Sealed-in anti-friction bearings eliminate any friction drag which might otherwise be imposed by the links. The flange of the universal joint is bolted directly to the bolster lug, while at the other end the attachment is made through a calibrated rubber mounting, with two stages of compression to provide the required characteristic over the full range of longitudinal movement.

In one of the graphs are shown the comparative performances of these three methods of link positioning. Plotting the performance of the two-link arrangement with the links both placed toward the same end of the truck as the base performance over a range of acceleration intensities varying from 5 to 15 per cent of gravity, the relative performances of the other two arrangements are shown in terms of their ratio to the base condition at each acceleration value. It will be seen that the four thrust links show a decidedly smaller number of shocks than either of the other two through most of the range of acceleration intensities for which tests were made. Only in the case of the highest acceleration intensity do



The protection of the elliptic springs improves the lateral as well as the vertical ride

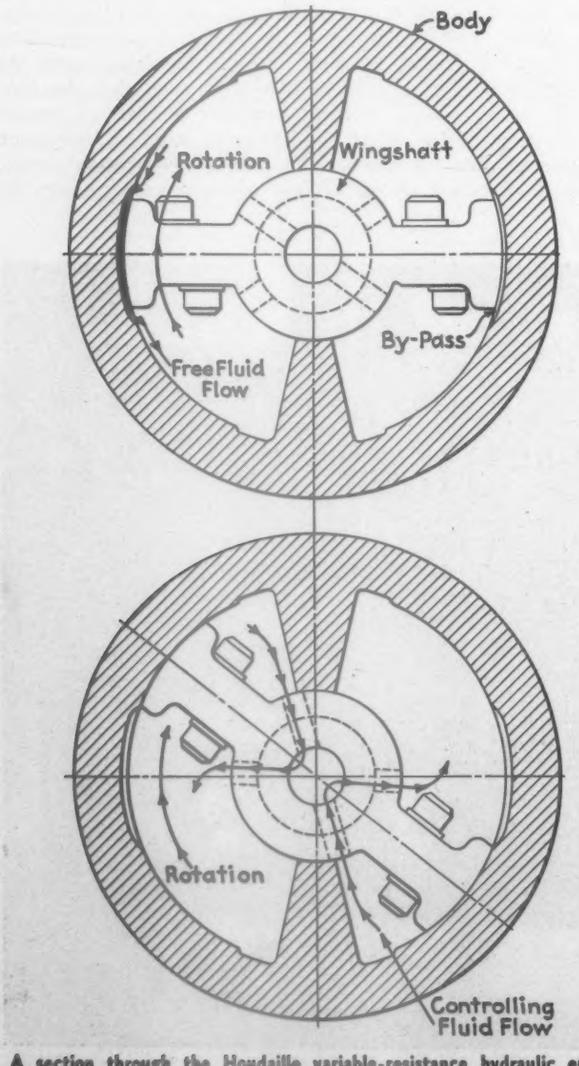
Each counter records the number of shocks at each of five rates of acceleration

the two links diagonally disposed approach the four-link arrangement in the smoothness of their performance.

The Variable-Resistance Hydraulic Energy Absorber

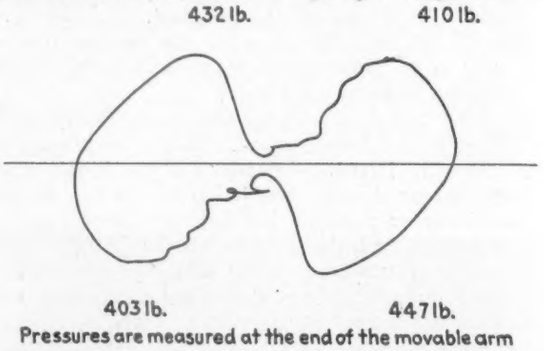
One of the photographs shows the Houdaille unit which has been specially developed to supplement the four-link positioners as a check on excessive lateral movement of the bolster. When it is in its normal or central position, the fluid can by-pass around the wing-shaft through a recess in the cylinder wall. This provides practically no restraint on the lateral movement of the bolster near its central position. Thus, the bolster hangers are free to perform their function of permitting the car body to ride forward undisturbed by lateral shocks of small displacement originating at the rail. As the lateral movement progresses, however, the by-passes are closed, and the hydraulic pressure then builds up, as shown in the sample indicator card, to cushion the effect of large centrifugal or other forces affecting the side motion of the car.

A new and essential feature is an indexing indicator which insures that the lever arm is properly located in its central position in relation to the by-pass. As shown in the illustration, this consists of two pieces of small round stock, one of which is welded to the movable lever and the other to the base of the unit. When the ends of these pieces are directly opposite each other, the device is in its central position and the by-passes are at maximum opening.



A section through the Houdaille variable-resistance hydraulic energy absorber

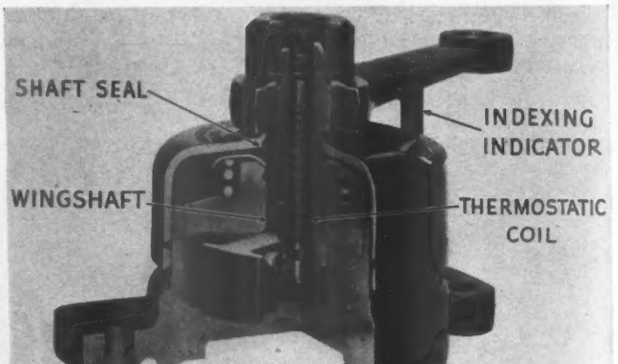
The shaft seal in this unit was especially designed for railroad applications. As can be seen from the cross-sectional illustration, there is a spring arrangement which maintains a constant pressure on the packing against the shaft. The center stem incorporates a thermostatic coil which automatically keeps the valve in proper adjustment to compensate for any fluid viscosity changes due to temperature variations.



Indicator card of the Houdaille variable-resistance hydraulic energy absorber

Bolster Spring Covers

The bolster spring covers, employed to insure unimpaired freedom of action of elliptic bolster springs, are similar in principle to those in universal automotive use. These covers are made of No. 24 gage terne plate, which is considerably heavier than that used in automotive practice.



Sectional view of the Houdaille hydraulic energy absorber

In installing these covers the springs are first thoroughly covered with grease, and canvas pieces wrapped around them. The telescopic bottom and side covers are then installed and the continuous top cover snapped in place over the flanges of the sides. The joint is then permanently closed by crimping. Holes for the insertion of a grease gun are provided for convenient addition of lubricant when desired.

The four-unit bolster link assemblies, supplemented by the variable-resistance Houdaille hydraulic energy absorbers, and the elliptic spring covers have been placed on the market through an arrangement with E. A. Lundy, Inc., 420 Lexington Ave., New York, as a means of effecting permanent improvement both in the lateral and vertical riding qualities of conventional passenger-car trucks. Trucks so equipped are now in service under certain cars operating on the New York Central and on the Pennsylvania.

Union Pacific Gets 20 More

4-6-6-4 Steam Locomotives

The third order of this wheel arrangement since 1936—The new locomotives have a higher boiler pressure and smaller cylinders—There are 14 wheels on the tender

THE last of an order for 20 single-expansion 4-6-6-4 articulated steam locomotives has recently been delivered to the Union Pacific by the American Locomotive Company. The road now has a fleet of 60 of these locomotives. Fifteen—the first of this particular wheel arrangement—were delivered in mid-summer 1936 and 25 more a year later. Those locomotives carried 255 lb. boiler pressure and had 22-in. cylinders. All three orders develop the same tractive force.

This 4-6-6-4 type, designed by Otto Jabelmann, vice-president of the Union Pacific, in cooperation with the American Locomotive Company to operate in high-speed freight service in mountain territory, has rapidly received country-wide recognition. To date, the American Locomotive Company has built, or has on order, 155 of this type locomotive for six different roads.

The last order of 20 locomotives recently delivered to the Union Pacific were specified to be capable of operating continuously under maximum horsepower output up to 70 m.p.h., to operate on grades of 3 per cent, and to pass curves of 20 deg. They have cylinders 21 in. in diameter by 32-stroke, 69-in. driving wheels, and carry a boiler pressure of 280 lb. per sq. in. which produces a calculated tractive force of 97,350 lb.

The weight on each driving axle was limited to 67,500 lb. and the total weight on drivers is 404,000 lb. The total weight of the locomotive is 627,000 lb., of which 101,000 lb. is carried on the leading truck and 122,000 lb. on the trailing truck. The weight of the tender, fully loaded, is 436,500 lb., making the combined maximum weight of the locomotive and tender 1,063,500 lb.

The Boiler and Frame Structure

The boiler was designed and manufactured with the utmost care. The grate and firebox were proportioned to burn soft coal having approximately 11,800 B.t.u. per pound. All boiler plates are of Bethloc steel deoxidized. Horizontal seams have a saw-tooth welt strap inside and a straight welt strap outside with all joints caulked inside and outside.

The Elesco Type E superheater of 90 units, 1⅜ in. diameter, has 177 4-in. No. 9 flues and 45 2¼-in. No. 12 flues. The tubes and flues are 20 ft. long and were furnished by the Republic Steel Company.

The firebox has a horizontal mud ring with large radii at the corners, and includes a combustion chamber 106 in. long. It has a grate area of 1322 sq. ft. and a heating surface of 500 sq. ft. Five Security circulators in the firebox, with none in the combustion chamber, furnish 81 sq. ft. additional heating surface and support an American brick arch. The grates are Firebar with 15 per cent air opening, and the coal is fed to them by a Standard MB type stoker with engine on the tender. Fire doors are Franklin Butterfly type. The boilers are equipped with the Electro-Chemical automatic blowdown and foam collapsing trough system and have Prime washout plugs and Wilson blow-off cocks. The staybolts are the Flannery KM welded type.

The boiler is fed by one Nathan live-steam injector located on the right side, capable of supplying the boiler under maximum horsepower output, and one Elesco Type TP exhaust steam injector of equal capacity located on the left side. The smokebox arrangement is the labyrinth type developed by the railroad company. The smoke stack is double and its extension is of the multiple flare type formed to act in cooperation with the four exhaust-nozzle jets also developed by the railroad company. A smoke deflector is fitted to the top of the double stack.

A water-circulating nozzle pointed toward the rear and operated by steam from the enginehouse steam line is located in the bottom of the first course near the front. This improves circulation when firing up a cold boiler producing a more even temperature throughout, thus reducing stresses due to expansion.

Both the front and back engine units are equipped

with General Steel Castings Corporation frame beds with cylinders, including back cylinder heads, cast integrally. The articulation hinge comprises a tongue cast on the rear of the front engine-bed unit, fitting into a cavity in the front of the rear engine-bed unit. Bushings for the articulation pin are made in step sizes so that renewals can be made without disconnecting the front engine, and force-feed lubrication is provided. Part of the weight of the rear engine unit is transmitted to the front engine units since it rests on top of the articulation hinge tongue. By transmitting the weight of the boiler at two points on the front frame structure—namely, the main boiler bearing and the articulation hinge—perfect stability of the front frame structure is afforded. This requires, however, that the spring rigging must be built with maximum flexibility and engine truck equalized with the spring suspension of the front engine units.

The Running Gear

The driving wheels are of the Alco Boxpok type. The main wheels are the rear pair on each unit and are the only pairs which are cross-counterbalanced. The reciprocating weights on each side of the locomotive amount to 1,656 lb. on the front engine and 1,517 lb. on the rear engine. Twenty-five per cent of these weights are balancing, giving a reciprocating overbalance of 138 lb. in each driving wheel on the front engine and 126 lb. in each driving wheel on the rear engine.

These locomotives have incorporated in their design the "lever principle" developed by the builders, which comprises correctly established engine-truck and trailing-truck lateral resistance together with lateral-motion devices on the first and second pairs of drivers of each group, which permit the units when curving to pivot on the back pair of drivers and so to enter and pass through curves with a lever action. The use of this principle, together with ample flexibility in the spring rigging, greatly reduces all wheel binding, and by reducing lateral stresses greatly prolongs the life both of the locomotive structure and of the track.

The main driving axles are of low-carbon nickel steel, while the others are straight carbon steel, all hollow bored, and equipped with Timken roller bearings.

Alco geared roller centering-device engine trucks are used with SKF non-self-aligning roller bearings. The center plate is sealed against the entrance of dirt and is lubricated by force feed. Force-feed lubrication is also applied to the teeth of the geared rollers. The trailer truck is of the General Steel Castings Corporation four-wheel radial type, both wheel and axle units being of the same size and equipped with SKF roller bearings.

Frame pedestal shoes are of hard bronze, while the wedges are of forged steel with a bronze lining on the pedestal face. Franklin automatic compensators and snubbers are applied to all wedges.

The pistons are the Locomotive Finished Material Company's light-weight, rolled-alloy-steel three-ring design. Cylinder and piston-valve bushings are of Hunt-Spiller gun-iron especially hardened. Paxton-Mitchell rod packing is used.

Crossheads and guides are of the multiple-bearing type. Instead of rigid bolted fastenings at their ends, the guides are clamped in position by means of the Alco Slidguide device, which permits of sufficient flexibility longitudinally to prevent distortion. Main and side rods are of low-carbon nickel-steel with channeled eyes. Side

In the erecting shop—The boiler ready for the lagging

rods are of articulated design without knuckle pins. All crank pins, except the front, are provided with Prime Alemite hard-grease fittings for internal lubrication. Main- and side-rod bushings are of Magnus bronze.

Walschaert valve gear is used with trunnion links and special lightweight eccentric cranks attached to the main pins with two bolts each. McGill needle bearings are applied throughout the valve gears except at the rear ends of the eccentric rods, which take an SKF self-aligning roller bearing. An Alco type H reverse gear with 12-in. diameter cylinder and 24-in. stroke is connected to the reverse shaft arm of the rear engine unit. The piston valves are 12 in. in diameter, of lightweight design, and are fitted with Hunt-Spiller Duplex bronze and cast iron, lip type packing rings.

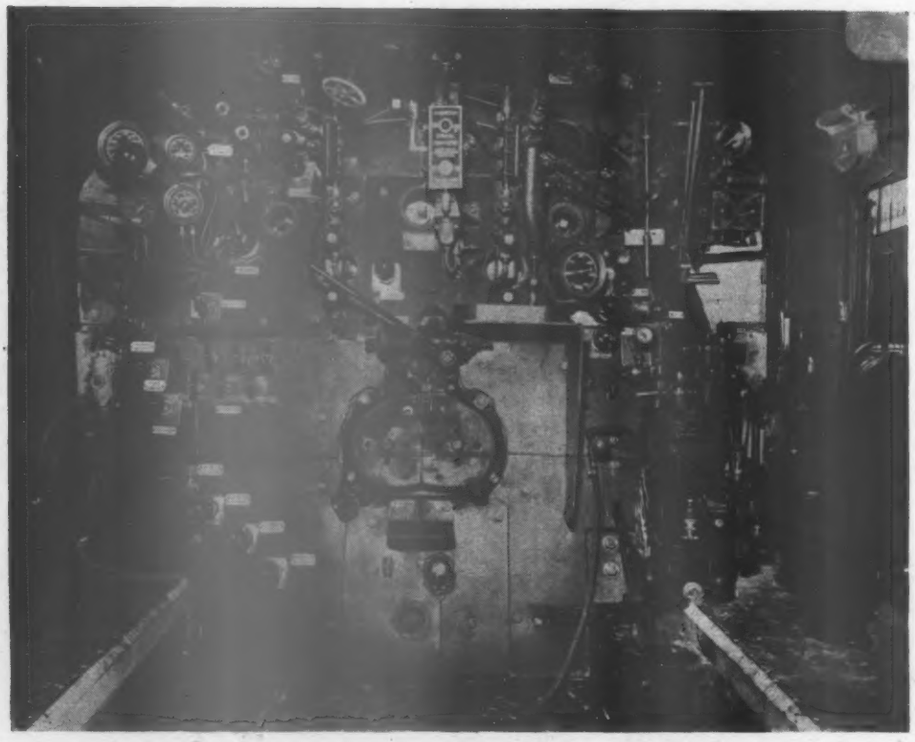
Great care was used in proportioning the areas of all steam and exhaust passages. The system of steam pipes employed has been developed by the builders for articulated locomotives with the idea of providing for all necessary movements, but requiring a minimum of maintenance. Steam pipes to the front cylinders are of the jack-knife design hinged on semi-ball joints, all alike and exerting no spreading pressure. Metallic packing is used everywhere except in the slip joints in the rear cylinder steam pipes. These slip joints are ported so as to be perfectlly balanced against the effect of internal pressure. The exhaust pipes from the rear cylinders extend forward and join under the base of the rear exhaust stand, while the single exhaust pipe from the front cylinders has the usual ball joints front and rear with a ring-packed slip joint. Steam enters the drypipe through an Elesco Tangential dryer.

The Spring Rigging

The engine truck employs parallel spring suspension wherein one-third of the load is carried on semi-elliptic springs and the remaining two-thirds on coil springs. A shallower and, therefore, more flexible semi-elliptic spring is thus obtained and serves as a damping spring, while the initial shocks are absorbed by the coils. This

A complete front engine unit

The cab is supported directly from the boiler—. In the lower foreground is the centrifugal pump portion of the Elesco type TP exhaust-steam injector



The back boiler head presents an orderly appearance

parallel type of spring suspension greatly improves riding.

The driving springs are all seated on rollers. Cushioning coil springs are located at the dead ends of the equalization system on both engine units at the bottom end of the rear trailer-truck spring hanger and between the engine-truck equalizer and the front cross equalizer. Wherever possible, loop-type spring hangers are used. Load-carrying spring-rigging pins are reduced to a minimum, but where they would commonly be employed at the joints between equalizers and spring hangers blocks of Gatke Grafitex are inserted. This same material is used for the few pin bushings employed.

Lubrication

Each locomotive is equipped with four Nathan mechanical force-feed lubricators of 30 pints' capacity. Two of these are used for the lubrication of the guides, driving-box shoe and wedge faces, trailing-truck pedestals, articulation hinge in, engine-truck center castings, trailer-truck center plate, radial buffer, power-reverse gear and intermediate reach-rod crosshead. The other two lubricators are used to lubricate the cylinders, valves, steam-pipe joints, throttle, stoker, piston-rod glands, boiler bearing, and front exhaust-pipe slip joint. Alemite soft-grease fittings are employed on the valve motion, brake rigging and throttle rigging.

The Cab

The cab is supported entirely from the boiler by a construction perfected by the builder, in which the cab travels with the expansion of the boiler and has no connection with the frame whatsoever. The railroad company's design of rear closure, consisting of four folding doors, is used.

The Pilot and Bumper

The pilot is cast integral with the front bumper beam. Its top section consists of a swing-type coupler which, when in closed position, fits the contour of the pilot and

The front end of the tender

removes all obstructions. This design was also used on the 4-8-4 type locomotives built for this railroad.

Brakes

Brake-operating equipment is New York Schedule 8-ET with KM vent valves on both the locomotive and tender. Two 8½-in. cross-compound air compressors

Principal Dimensions Weights and Proportions of the Union Pacific 4-6-6-4 Type Locomotives

Railroad	Union Pacific
Builder	American Loco. Co.
Type of locomotive	4-6-6-4
Road numbers	3950-69
Date built	1942
Service	Freight
Height to top of stack, ft.-in.	16-2½
Weights in working order, lb.:	
On drivers	404,000
On front truck	101,000
On trailing truck	122,000
Total engine	627,000
Tender (two-thirds loaded)	348,500
Wheel bases, ft.-in.:	
Driving	12-2
Engine, total	60-4½
Engine and tender, total	106-8
Wheels, diameter outside tires, in.:	
Driving	69
Front truck	36
Trailing truck	42
Engine:	
Cylinders, number diameter and stroke, in.	2—21 x 32
Valves, piston type, size, in.	12
Maximum travel, in.	7
Steam lap, in.	1⅜
Exhaust clearance, in.	⅛
Lead, in.	¼
Boiler:	
Type	Straight top
Steam pressure, lb. per sq. in.	280
Diameter, first ring, inside, in.	94 11/16
Firebox, length inside, in.	187 1/32
Firebox, width inside, in.	108 2/16
Combustion chamber length, in.	106
Circulators, number	5
Tubes, number and diameter, in.	45-2¼
Flues, number and diameter, in.	177-4
Boiler (continued):	
Length over tube sheets, ft.-in.	20-0
Grate area, sq. ft.	132.2
Heating surfaces, sq. ft.:	
Firebox and comb. chamber	500
Circulators	81
Firebox, total	581
Tubes and flues	4,214
Evaporative	4,795
Superheater	2,162
Comb. evap. and superheater	6,957
Tender:	
Type	Water bottom
Water capacity, gal.	25,000
Fuel capacity, tons	28
Trucks	1—4-wheel—5 axles in pedestal
Rated tractive force engine, 81 per cent, lb.	97,350
Weight proportions:	
Weight on drivers ÷ weight engine, per cent	64.43
Weight on drivers ÷ tractive force	4.15
Weight of engine ÷ evap. heating surface	130.80
Weight of engine ÷ comb. heating surface	88.08
Boiler proportions:	
Firebox heating surface per cent comb. heating surface	7.19
Tube-flue heating surface per cent comb. heating surface	60.57
Superheater heating surface per cent comb. heating surface	31.07
Firebox heating surface ÷ grate area	3.78
Tube-flue heating surface ÷ grate area	31.87
Superheater heating surface ÷ grate area	16.35
Comb. heating surface ÷ grate area	52.61
Evaporative heating surface ÷ grate area	36.27
Tractive force ÷ grate area	736.30
Tractive force ÷ evaporative heating surface	2.03
Tractive force ÷ combined heating surface	14.00
Tractive force × diameter drivers ÷ comb. heating surface	965.60

are mounted on the frame at the front end and are operated by superheated steam. Finned type radiators are used in the cooling system. Neither the engine truck nor the trailer truck is fitted with brakes, but the engine truck is designed for their possible future application.

Tender

The tenders have a water capacity of 25,000 gallons and a coal capacity of 28 tons. They are built on General Steel Castings Corporation water-bottom beds, carried at the front on a four-wheel center-bearing truck back of which are five pairs of wheels mounted in pedestals cast integral with the tender bed. All wheels are 42 in. in diameter and have Timken roller bearings in outside journal boxes. The four-wheel truck is equalized and the boxes in the frame pedestals are equalized together on each side to form a three-point load suspension. Over each frame pedestal box is a single semi-elliptic spring and two coil springs. The front and back ends of each equalizing system are anchored to the bed casting through tandem coil springs. On top of each frame pedestal box and under the semi-elliptic spring is fitted a General Steel Casting Corporation centering device made up of rubber blocks sandwiched between steel plates. The upper ends of these devices are guided to prevent lateral movement, but their lower ends can move laterally with the boxes against the shear resistance of the rubber. Lateral movement of the rear boxes is restricted to less than that on the other boxes.

Between the engine and tender there is a Franklin E-2 radial buffer. Flexible joints between engine and tender for the stoker are Barco, while those for the steam-heat line are Franklin. Brake conduits are U. S. Rubber armored hose. Tank values are 4-in. gate type and suction hose is Hewitt Rubber, 4½ in. diameter. At the rear end is a Miner type A 94XB draft gear and a National AAR Type E coupler, 6½-in. by 8-in. swivel butt, double-rotary, bottom operated. The tender frames are arranged for the future application of buffer mechanism at the rear end.

T. & N. O. Caboose

THE Temiskaming & Northern Ontario now has in service eight all-steel, wood-lined caboose cars of an unusual design which were built by the National Steel Car Corporation, Hamilton, Ont. The overall length of the cars, over pulling faces of the couplers, is 38 ft. and the light weight is 50,000 lb.

The underframe has a center sill consisting of two 12-in. wide by ⅜-in. thick web plates, two top outer angles 3½ in. by 3½ in. by ⅜ in., four bottom angles (two inner and two outer) 3½ in. by 3½ in. by ⅜ in. and a top cover plate 21 in. wide by ⅜ in. thick, the whole being riveted together. The depth of the box-like structure is 12⅞ in. The remainder of the underframe

The bolsters, fabricated by riveting, consist of a bottom cover plate ⅜ in. thick, measuring 24 in. wide at the center sills and 18 in. wide at the side sills, with a top cover plate ⅜ in. thick, 18 in. wide. Bolster diaphragms of 14-in. plate are spaced 12 in. back to back. The bolster-center-sill separator is cast steel, with extended side arms front and back, the tops of which are flanged inward to form an additional support at the top cover plate. All bearing surfaces are accurately machined to insure correct and proper fitting at the bearing surfaces. The center plates are A. A. R. standard design. The front and back draft stops are steel castings and the bearing surfaces are machined.

T. & N. O. all-steel caboose

is a departure from the more conventional type of caboose car underframe. The floor is supported on 5-in. 10-lb. I beams, spaced about 37-in. centers and running transversely. These supports rest on top of the center sills, to which they are welded. Each side sill consists of a 7-in., 9.8-lb. channel to which is riveted, by one flange, a 3-in., 5.1-lb. Z, the other flange of the Z forming the face for the riveting of the ⅛-in. thick steel side sheathing. By the use of the transverse I-beams, crossbearers are eliminated. The entire underframing is covered with 1/16-in. thick steel sheets supported on and welded to the I beams. Cemented to this floor sheet is a layer of Johns-Manville waterproof felt bedded in plastic. Six wooden floor nailing strips, 1⅝ in. thick by 3 in. wide, and bolted to the I beams, run full length of the car. Between these strips, two ¾-in. thick layers of Johns-Manville Hairinsul are laid. A 1-in. thick wood floor is then laid diagonally. A layer of waterproof felt, laid in plastic, is applied prior to the laying of the top longitudinal, ¾-in. thick floor.

The body end sill is made up of a 7-in. 16.4-lb. channel, with a top cover plate 5/16-in. thick by 10½-in. wide, extending the full width of the car. The platform and end sill consists of a 7-in. 16.4-lb. channel, the back forming the outer face, with top, bottom and back of ¼-in. plate, the whole forming a box-like structure. Two pressed steel caps close in the ends. The platform side sills are 6-in. 8.2-lb. channels. Other center sill separators are made of 3/16-in. plate pressings.

The side posts are 3-in. 5.1-lb. Z-bars, 11 on each side. Each of the four corner and end posts is a 4-in. 8.2-lb. Z. The roof carlines of the body and cupola are angles formed on a radius.

The outside sheathing of the body and cupola is ⅛-in. thick copper-bearing steel, and the roof sheets are No. 14 gage steel riveted to the carlines.

Inside wood sheathing 13/16-in. thick by 2¼-in. face tongue-and-grooved with small V, is blind-nailed to wood nailing strips which are bolted to side posts and end posts. The ceiling is finished in a like manner.

Principal Dimensions and Weights of the T. & N. O. Caboose Cars

Length over pulling faces of couplers, ft.-in.	38- 0
Length over platform end sills, ft.-in.	34- 8¼
Length, inside (body), ft.-in.	28- 4⅜
Width over eaves (body), ft.-in.	9- 8⅜
Width inside, ft.-in.	8-10
Length inside cupola, ft.-in.	5- 5⅞
Width over cupola eaves, ft.-in.	8-10⅝
Width, inside cupola, ft.-in.	8- 2½
Height, rail to center of coupler knuckle, ft.-in.	2-10½
Height, rail to top of floor (body), ft.-in.	4- 1¾
Height, rail to running boards (body), ft.-in.	12- ¾
Height, rail to top of cupola, ft.-in.	15- 3
Height, floor to ceiling (body), ft.-in.	7- 4½
Truck centers, ft.-in.	19-10
Wheel base, ft.-in.	5- 6
Wheel diameter, in.	33
Type of wheel	Cast iron
Journal size, in.	5 x 9
Light weight, lb.	50,000

There is no metal contact from the exterior to the interior, thus, frost from the outside cannot be transferred to the inside of the caboose. Before the inside nailing strips and wood lining are applied, the entire interior metal surfaces are coated with plastic, and while wet, a complete layer or covering of waterproof felt is applied, thus, no bare metal is visible from the interior of the caboose. The space between the posts and carlines is filled with a layer of 1-in. thick Salamander. The insulation at the side sill recesses has been kept 2 in. from the bottom of the side sill, thus forming a gutter for catching moisture. Two ⅝-in. holes, drilled in the bottom of each side sill and end sill, in the space between each side post and each end post, drain off any accumulation of moisture. Further, these holes afford circulation of air which assists in keeping insulation dry.

The seats and seat backs, of wood construction, forming the lower berth, slide forward forming a support for the mattress. When in normal closed position, the space under the seat provides a locker for the bed linen, the seat forming the hinged cover. The upper berths of metal are raised and lowered according to requirements. All mattresses are 4 in. thick, 30 in. wide and 6 ft. long. A step ladder affords access to each upper berth. Adjoining each berth section is a metal locker.

Adjoining the conductor's locker, a desk arrangement is located, with ample drawer space below and compartment space above. Next in line is the metal coal box holding about 550 lb. of coal, the inside being arranged to feed coal to the door.

The latest type of caboose stove, thoroughly insulated walls, ceiling and floor provide a safe and convenient place for cooking. Under the cupola floor, on this side of the caboose, is storage space. Next, the adjoining locker at the end of the caboose is a metal-lined dope, oil and service supply locker. Under the cupola floor is a white enameled metal refrigerator.

Adjoining the cupola partition is a stainless-steel corner type wash basin, above which is a water cooler of stainless-steel.

The sliding side windows of the cupola are large, eliminating dead vision spots. Each half of the cupola contains a reversible seat. The inner sash of the end cupola windows are sealed; the outer sash, hinged.

As a safety measure, the platform railing has been increased to 3 ft. 8 in. from the top of the platform floor, with a light-weight folding tail gate and additional self-locking safety bar adding further safety for the crew.

Welded platform steps, of the passenger-car type, with 1 in. thick oak treads secured to the metal step treads, provide safe footing. The height from the rail to the top of the bottom tread is only 14½ in. instead of the usual 18 in. A vertical handwheel-operated power brake is located at the platform railing at each end of the car.

The running boards are of wood, 1⅛ in. thick by 7½ in. face, mounted on metal saddles riveted to the roof.

The trucks have Symington 5-in. by 9-in. cast-steel truck sides with lateral-motion roller-type bolster; Symington resilient-type side bearings; double elliptic springs and cast-iron wheels 33 in. diameter. The cabooses are equipped with Westinghouse AB brakes.

The exterior sides of the cabooses are finished in Dulux aluminum upon which in a golden yellow panel, with black border, appear the name of the road and caboose number in black. Similar treatment is afforded the worded slogan which appears in an oval-shaped design about the center of the cupola. The platform railing ends and ends of the cupola are signal red; the underframe and trucks, black.

The interior walls, doors, and other equipment are light blue-grey; the ceilings cream, and floor terra cotta red.

The interior is designed for maximum comfort and convenience

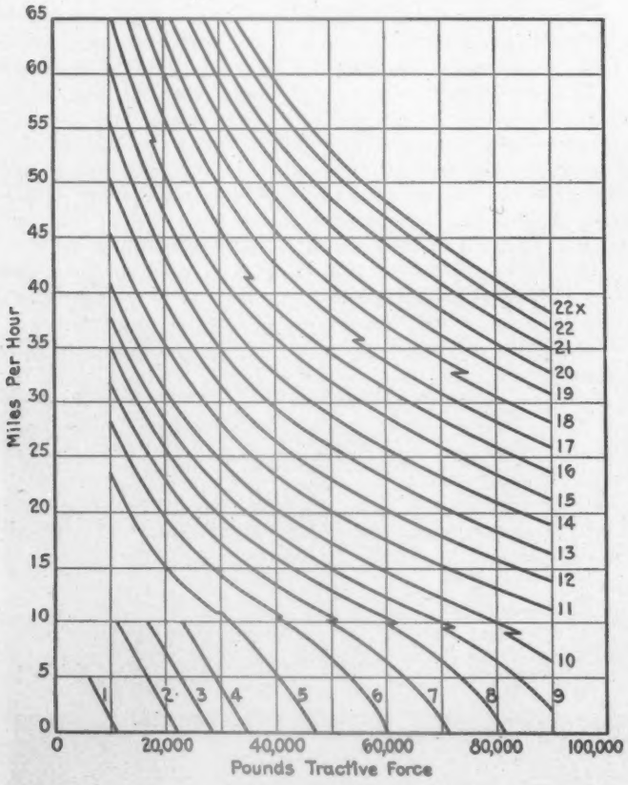
The New Haven's Latest

A. C. Electric Locomotives

By Charles Kerr, Jr.* and F. L. Alben*

Designed for freight service they can be used also for hauling heavy passenger trains between New York and New Haven

THE New York, New Haven, and Hartford Railroad has recently placed in service three of five Westinghouse a.c. electric freight locomotives, road numbers 0150-0154. These will handle 5,000-ton trains (125 cars) in either direction between the New York terminals and New Haven. They are primarily intended for freight service, but are occasionally employed as passenger power. In this service they handle 20-car trains between New York (Pennsylvania Station) and New Haven.



Locomotive performance curve showing 22 main running combinations

The principal features of the locomotives are indicated in the table.

Locomotive Cab

The locomotives are streamlined according to the latest New Haven practice. Added safety is assured the crews by having the operating compartment set back from the ends about eight feet. The entire cab, which carries all equipment except the propulsion motors, is carried upon the main trucks on center-pins and spring loaded sliding supports. A bridge truss extends along each side to furnish sufficient strength in the cab structure, especially for lifting at the ends. The side sheets were formed over metal shapes, fitted and welded; the seams are then ground to give a one-piece smooth appearance. For ready access to the equipment housed in the cab, three removable hatches are placed in the roof. The end hoods are also removable.

* Transportation Engineers, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

There are doors at each end of the cab, and also two on each side. The engineer's compartment can thus be reached either from the sides or the ends. The interior consists of several compartments. The end hoods house small apparatus, such as compressors, cab signals, battery, etc. Next are the engineer's or operating compartments which are heavily insulated for comfort under extreme weather conditions. The central portion houses the main control apparatus, blowers, transformers, etc. In this main central compartment, the 11,000-volt apparatus is further isolated into a compartment.

Approximately 50,000 c.f.m. of ventilating air is required for the apparatus. The blower intake is through grilles in the side of the cab. The discharge from the blowers is taken to the motors and transformer through a duct along the bottom of the cab. Sand boxes, four per side, are built into the sides of the cab and can be filled either from the inside or the outside of the cab. There are also a number of special features built into the cabs, such as defrosters, window wipers, rain gutters, water drains and built-in steps for access to the roof equipment. Engineer's side windows are of the double sliding type, while the front windows are fixed, the glass being shatterproof and easily removable.

The cab is designed for the future addition of train heating equipment, including boiler, water tanks and fuel tanks. As a freight locomotive, in the absence of the train heating apparatus, 53,000 lb. of ballast is carried in the form of steel slabs bolted into place.

Running Gear

The running gear consists of two main integral cast steel frames mounted on two 4-wheel guiding trucks and six pairs of driving wheels. The two main frame castings are connected by a ball, socket and pin articulated joint through which the entire tractive force of the locomotive is transmitted. The centerpins which carry the cab are located ahead of the first pair and back of the last pair of drivers, which permits a short rigid driving wheel base, enabling the locomotive to negotiate a 20 deg. curve. In addition to the center-pins, there are two spring loaded cab supports on each main frame which carry 40 per cent of the cab weight and provide for the proper weight distribution at the rail.

The main and guiding truck frames were supplied by the General Steel Castings Corporation and are of integral cast steel construction; all wearing surfaces are protected by hardened plates and bushings which can be easily renewed when necessary.

Each main truck frame is supported on a three-point

equalization system. The three driving axles in each main frame are equalized together on each side furnishing two points of support for the frame, while the third point is supported by the guiding truck center-pin, thereby providing stability for the locomotive in the horizontal plane. The spring rigging follows existing practice of the railroad. This practice incorporates heavy coil springs which are placed between the semi-elliptic main springs and the journal boxes. All equalization pins have hardened bushing pins and Alemite fittings.

Principal Dimensions and Weights of the N. Y. N. H. & H. A. C. Electric Locomotives

Wheel arrangements	4–6+6–4
Weight, lb.:	
On drivers	360,000
Per driving axle	60,000
On trucks	140,000
Per truck axle	35,000
Total	500,000
Wheel bases, ft.-in.:	
Total	69
Driving	37-4
Rigid	13-8
Length over couplers, ft.	80
Length, cab, ft.	76
Width cab, ft.	10
Height over locked down pantograph, ft.	15
Wheel diameter, in.:	
Driving	57
Guiding	36
Maximum tractive force, 25 per cent adhesion, lb.	90,000
Maximum horsepower	9,100
Speed at maximum horsepower, m.p.h.	38
Tractive force at maximum horsepower, lb.	90,000
Continuous hp. at 65 m.p.h.	4,860
Continuous hp. at 39 m.p.h.	4,780

The main brake rigging is of the equalized outside-hung single-shoe type, schedule 14EL, designed to give 80 per cent braking power with 50 lb. brake cylinder pressure. Two UAD 16-in. by 12-in. cylinders are mounted on each main truck frame near the guiding trucks. Special care has been given to the brake system to insure accessibility for inspection and maintenance. The guiding truck brakes are of the clasp type using two 7-in. by 7-in. UAH Duplex brake cylinders per truck, furnishing 62 per cent braking power with 50 lb. cylinder pressure. All brake hangers are fitted with hardened bushings and pins. The shoes are spring balanced.

Guiding Trucks—Cab Restraint

The four-wheel guiding trucks of the equalized type have rockers with variable restraint. This restraint starts at 27½ per cent crack-off, increasing to 32½ per cent at 1½-in. truck swing, then dropping to 17 per cent of the center-pin load at full truck swing. A radius bar, spring restrained to 5,500 lb. is fitted to the inside of the truck frame to prevent oscillation of the truck around its center when operating at high speeds on tangent track, thus insuring smoother performance of the locomotive. When operating around curves, the load on the restraint spring decreases.

The cab restraint device is located at the center of the cab directly above the articulation of the main frames. It consists of a double cam spring loaded roller device with a spring set up of 4,000 lb. for each spring. It has been established from actual service that due to the accumulation of wear in the articulation parts, there is a tendency in an articulated locomotive to swivel the main trucks relative to the cab on tangent track when operating at high speeds, causing the locomotive to nose through the track clearance. This may become critical if the natural frequency of the locomotive is synchronized with the nosing period. The cab restraint device keeps the main trucks in line with the cab and eliminates this tendency to nose on tangent and relatively low degree curves, but permits freedom of movement without any restraint when operating on sharp curves. This device has given satisfactory performance for eight years.

Flexible Cup Drive

With the twin traction motors mounted rigidly to the main truck frame the Westinghouse flexible cup quill drive is used. This selection was based on satisfactory results obtained through long years of service with millions of miles of operation back of it. This drive per-

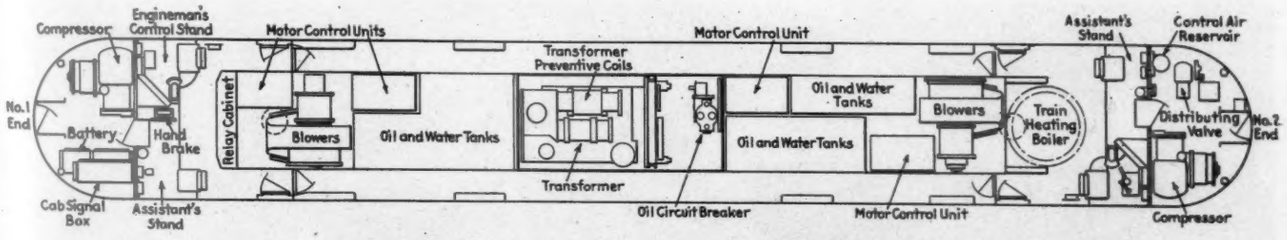


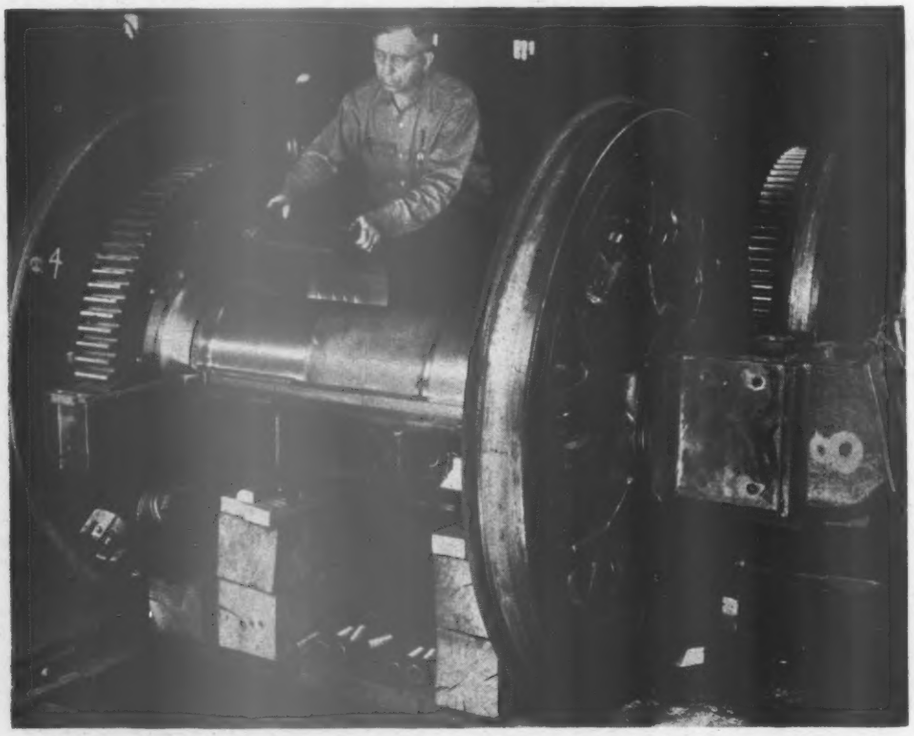
Diagram showing the arrangement of apparatus in the locomotive cab

New York, New Haven & Hartford 11,000-volt a.c. freight locomotive built by Baldwin-Westinghouse

mits the torque to be transmitted from the motors to the driving wheels while allowing the axles to function in a normal way. The drive consists of a quill with drive spiders and six spring cup assemblies on each end engaging the driver wheel spokes. The quill is carried by the motor frame and lubricated by a heavy wick dipped into an oil reservoir and bearing against the quill bearing. The quill is fabricated by welding process from steel accurately machined, ground and assembled to assure of uniformity of material and interchangeability. The drive springs are made of alloy steel and designed to go solid at approximately 57 per cent adhesion; the cups will go solid at approximately 52.2 per cent adhesion based on 60,000 lb. rail driver load. Hence, since the cups go solid first, it is impossible to overstress the springs. The cups are made of mild steel forging machined and case hardened to provide long wear.

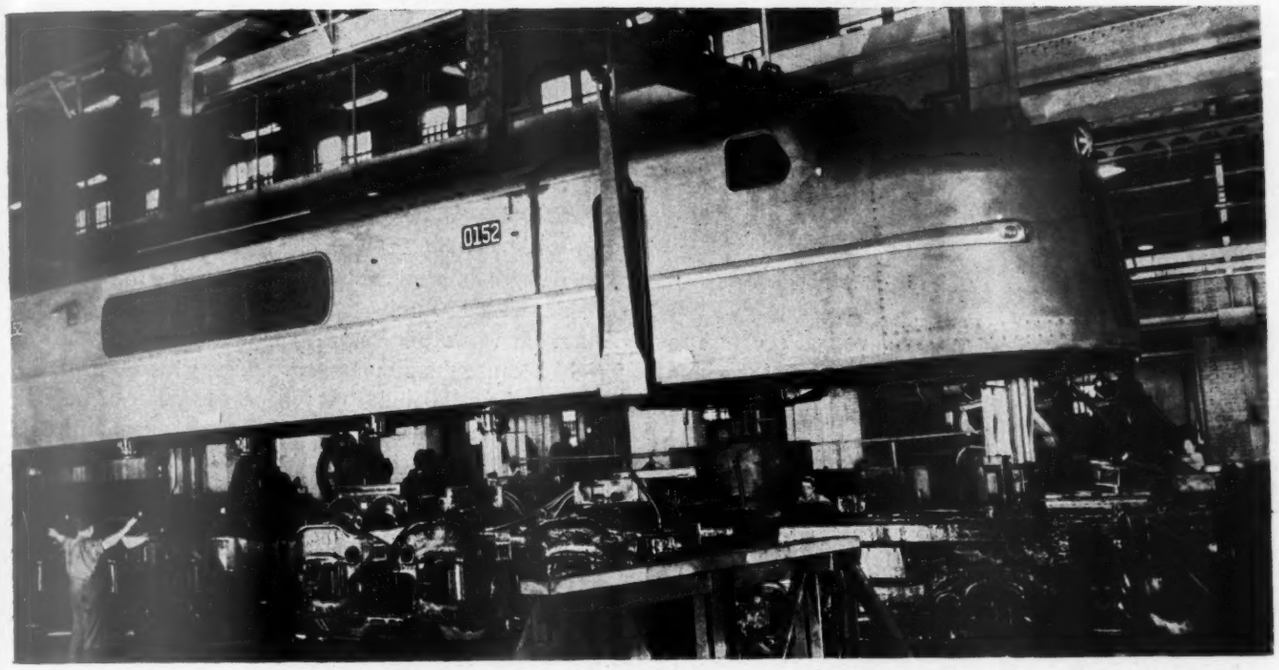
Electrical Equipment

Each of the six driving axles is driven by a twin,



The quill drive—the quill is fabricated by welding and is carried by the motor frame—six spring cup assemblies on each spider engage the spokes of the driving wheel

The locomotive cab under construction



The floating locomotive cab weighs 142 tons; the chassis, 108 tons

The engineer's control and brake stand — the assistant's stand is directly across the cab

single phase, 25-cycle commutating pole series motor. Each twin motor rates 810 hp. continuously, and for shorter periods can produce a maximum output of 1,500 hp. Initially for freight service, the motors are geared 18/89 teeth, 4.95 to 1 ratio, for a maximum locomotive speed of 65 m.p.h. Provision is made for the application of 90 m.p.h. gearing whenever it should become desirable to do so.

Each twin motor is mounted on the main truck frames by a three-point support. On one end of the motor the two supporting feet are bolted solidly to the frame by means of keys. The third point of support on the opposite end is a sliding pad which permits the motor to expand longitudinally.

The arrangement of the control apparatus in the cab is shown on the diagram. The heart of this control system is the transformer unit on which is mounted the control switches, etc. To permit smooth control, 22 normal running steps are used. Under conditions of bad rail, etc., these 22 steps can be split into 63 steps by a simple manipulation of the controller handle. The performance curve for the locomotive with the 22 main steps is shown.

The mechanical portion of these locomotives was manufactured by the Baldwin Locomotive Works, the electrical equipment by the Westinghouse Electric and Manufacturing Company, and the locomotives assembled in the Westinghouse plant at East Pittsburgh.

EDITORIALS

Find Out What You Can Get

Several times in recent weeks we have had occasion to visit the plants of some of the many builders of machine tools whose products find their way to the railroad repair shops. It would serve no special purpose to go into detail regarding the multitude of mechanical miracles that these manufacturers have accomplished in the past two years, for most of the important things they have done come under the head of military secrets. It does, however, serve a worthwhile purpose to call attention to certain matters of interest to the railroad shop man.

At the outset it is reasonable to say that the pressure of war production work has brought forth developments in machine tool design, tooling equipment and operation that, under peace-time conditions, would have been many more years in the making. Stated in another way, we now have the privilege of making use of machine methods that might otherwise have been months or years away. Already, in war production work, many methods formerly used are obsolete; far better ways have been found of doing the same jobs much faster. When the machining progress of only two years is observed one of the first impressions that a railroad shop man gets is that practically all railroad machining methods are now so far out of date that there is no comparison at all. This seems like a rather blunt statement but, be that as it may, the fact remains.

For years it has been pointed out that the modernization of railroad repair shop facilities would, in slack times, enable the roads to make substantial economies in repair operations and, in times like these, provide a margin of excess shop capacity that would make it possible to meet unusual demands even in the face of shortages of skilled labor such as are being experienced today. Several of the more progressive roads completed modernization programs before this country got into the war and today those are the roads with the fewest maintenance-problem headaches. They are also the roads that are helping out on war contract work, while keeping up their own motive power repair programs.

One of the reasons for backwardness in the modernization of railroad shop facilities is the traditional pride that certain railroad men take in "getting along with what we've got." For a New England farmer that is an admirable policy for it affects only his own ability to produce and his own ultimate economic status. It is not, however, a desirable policy in industry for the simple reason that in normal times one might easily get along with a 20-year-old machine capable of producing 50 units of work a day as compared, for example, with 150 units that a modern machine can produce. It was argued then that the old machine was all right because the 50 units was all that was needed. But today, when 150 units may be needed, it can only be produced on the old machine by the expenditure of three times as many man-hours—man-hours that might more profitably be used to help win the war.

We all know what lack of military preparedness means and many of the officers and supervisors who decided to get along with what they had can now look at these old machines and learn a lesson in industrial preparedness. For actually three skilled men are standing at the old machines today doing a job that could have been done by one man on a modern machine, while the other two men could be building more guns, ships or planes.

You may say, "Why bring this up now, it's too late to do anything about it." That's just the point, it isn't too late and something's got to be done about it—right now!

It isn't necessary to call attention to how much tonnage and how many passengers the railroads are being called upon to handle. More than ever before in history—that's an easy answer. What is necessary is to call attention continuously to the fact that equipment is being worn out two or three times as fast as ever before and if you're a shop man it's up to you to repair it and get it back in service in a hurry. To speed this job up there are several things you can do. First, and most important, you can find out what improvements are being made, mostly in war production work, that can be adapted to your work. You can do this by taking a few hours once or twice a month and visiting some nearby plant where the last word in modern equipment is being used or by attending local meetings of technical societies, foremen's clubs or similar organizations.

Second, you can personally acquaint yourself with the things you need in the way of shop equipment and machine tools that are available to you. Priorities or no, there are many things that you can get if you just know what can be had, and ask for it. Within 24 months one railroad has acquired over a million dollars worth of shop equipment by knowing what to ask for and keeping after it.

Third, don't let yourself get into the frame of mind that the railroads are not a defense industry and that, therefore, you have to take what's left over after everyone else has taken what he wants. Regardless of priority ratings the railroads are at least the second line of

defense. Anyone who travels on business these days and talks to people in defense industries is becoming more and more impressed by the fact that if the railroads fail so also will war production fail and the fighting forces will be handicapped by a shortage of the things they need.

Make it your business, therefore, to find out what's going on; find out what the other fellow has got that you could use to conserve man-power and increase output; find out where you can get it, then ask for it. If, for reasons best known to others, its use is denied you the responsibility will be theirs, not yours. But remember—the responsibility is yours, if you fail to ask.

Defective Cars Still Being Loaded

In spite of strenuous efforts, including a widespread publicity program sponsored by the Association of American Railroads, too many defective freight cars are still being loaded and, when unloaded, they are not repaired promptly enough. In the latter respect, it must be admitted that railroads seem to have partially at least the same attitude as the man who couldn't repair the leaky roof of his house when it rained and when the weather was fair he didn't need to.

A study of car conditions at one of the most important gateways in this country shows that three times as many loaded cars had to be transferred on account of mechanical defects and twice as many open-top loads adjusted in 1941 as in 1940, and railroad performance in these two particulars has not greatly improved up to date in 1942. In comparing figures for the two periods mentioned, the fact should be remembered that far more cars are now being interchanged, but it is also true that large numbers of cars have been taken from storage and loaded without repairing more or less dangerous defects and, as recently as a few weeks ago, a car equipped with obsolete and unsafe arch-bar trucks appeared at an interchange point where its load had to be transferred very much to the embarrassment of those responsible for the unnecessary labor cost and delay to the shipment which this transfer caused.

As stated in these columns, not long ago, freight cars have to be sent to repair tracks primarily for truck failures, including cracked side frames and bolsters, defective wheels, cut journals, broken brake beams, or hangers, etc., although car body defects, leaky roofs, defective doors and out-of-date airbrake cleaning and journal repacking constitute prolific sources of necessary car repairs with attendant delays. The urgent demand for more and more freight cars is, of course, responsible for the action of railroads in pressing every possible car into service, but cars which have been idle for a more or less extensive period of time should certainly receive careful inspection by competent mechanical men before being turned over to the operating department and placed for loading. It serves no one any good purpose to hurry this operation so much that defective cars are actually loaded and have to be repaired or have loads transferred at the first interchange point.

Another condition besides mechanical defects which delays freight cars submitted for interchange is the failure to load cars in accordance with the interchange rules and the disarrangement of loads in transit, generally due to non-observance of those rules, or rough train and car handling. At the important interchange point previously referred to, almost 700 open-top cars required load adjustment in 1941 owing to non-conformance with the rules and over 6,500 loads on open-top cars had to be adjusted on account of shifting. From the point of view of efficient and effective railway operation in the present war emergency, it will certainly pay railway men to redouble their efforts first, to avoid accepting incorrectly loaded cars from shippers and, second, to prevent the rough handling, whether it occurs on line or in transportation yards, which shifts loads and necessitate costly adjustments and delay.

While a certain rather limited number of load adjustments are required on box cars, due to side doors or various parts of the cars being forced outward, it is open-top cars which give most trouble from shifted loads, as outlined in the preceding paragraph. Open-top cars of the hopper type and gondola cars equipped with drop doors also are subject to delay owing to being offered in interchange with doors open contrary to the rules, or, in some instances, loss of lading due to defective or only partially closed drop doors. Almost 3,000 instances of open hopper or gondola car doors were reported at the interchange point mentioned in 1941, and over 300 cars had to be shopped on account of loss of lading through the drop doors, which was an improvement over 1940.

The record with respect to perishable freight handling was still better. With a total of 528,215 perishable loads handled, only 4,473 required shopping on account of mechanical defects and, of these, all but 52 cars were repaired promptly enough to make their original schedule deliveries. This is a good performance on the average and shows what can be done by concentrated effort devoted to a limited number of objectives.

Examination of the detail record, however, shows a wide diversity in effectiveness of the work on different railroads. The only answer is for the railroads individually and collectively to set up measuring sticks of performance for these desired objectives, publicize the results in a comparative statement, issued periodically and showing what each road is doing, correct and chastize (figuratively speaking) the "weak sisters," give special commendation and credit for exceptionally good performance and thus stimulate all to greater efforts in the joint enterprise now confronting the people of this country.

When In Doubt—

A frequently quoted axiom in many card games is, "When in doubt, lead trump." Trump in this war, so far as the labor situation is concerned, means the employment of women in all available jobs which they can fill and for which they can be hired. The operation of the Selective Service Act is making increasing inroads on the personnel of the mechanical departments of the railroads. It is possible, if the War Manpower Board ever really begins to function, that skilled workers from the railroad shops may be transferred to employment in other industries considered of more immediate importance to the war effort. Much has been made of the employment by a few railroads of a few women workers in mechanical occupations, but so far the number so employed means little in the whole labor picture.

If there is any doubt in the minds of mechanical department officers about the ability of women to perform many, in fact most, of the tasks involved in the repair and maintenance of equipment, they need only check the performance records of the women employed during the last war. The women of the present generation are at least as skillful as their mothers, and other industries are drawing heavily upon this pool of labor. Statements appear frequently from executives and supervisors attesting to the adaptability, capability and willingness of women who are being employed in increasing numbers in many industries, some of them on what was formerly considered "men's work." Most of the occupations on which men are now engaged in railroad shops are not beyond the understanding and performance abilities of women.

According to Pauline Goldmark, Manager, Women's Service Section, United States Railroad Administration, in a statement made in December, 1918, one railroad reported that women were employed in 99 different occupations on the road. Among these occupations relating only to mechanical department work were: lathe operators, drill-press operators, shaper operators, milling-machine operators, hammer operators, welders, cutters and burners, air-brake repairers and inspectors, turntable operators, locomotive wipers, car repairers, car repairer helpers, box packers, toolroom attendants, boilermakers, coppersmiths, electricians, coach carpenters, helpers and apprentices, patternmakers, helpers and apprentices, upholsterers, blacksmiths, mechanics helpers, painters, crane operators and laborers. With this variety of occupations represented, there can be no doubt that the labor shortage in railroad shops and enginehouses, present and prospective, can be relieved by the employment of carefully selected women workers.

With a probable need of more than 300,000 new workers in the railroad industry during the coming months there are not many choices to be made among the potential employees. Discards and rejects from other industries, youths under twenty and women now constitute the pool from which railroads can draw their new personnel. The first group are hardly likely to prove able or desirable; the second offers no more than a few months of potential service before the demands of the armed forces will take them; the third group can be trained, will perform ably, and will remain on the job as long as the emergency lasts.

It is interesting to note that among the total of 101,785 women employed at the peak of their service during the last war—October 1, 1918—only about 6,000 were employed in backshops and enginehouses. By July 1, 1919, only 82,294 women were on the payrolls of the railroads and the heaviest reduction in this force had occurred among those employed in the enginehouses and backshops. The same situation will undoubtedly occur when the present war is over as men are released from service and return to exercise their seniority rights in mechanical-department jobs.

There are difficulties involved in the hiring of women, but they are largely procedural and sanitary. Ways can be found to direct, supervise and, if necessary, discipline women employees. Additional rest and washroom facilities can be supplied. Other industries have done it; the railroads can. Not a difficulty but a point to be carefuly considered is the manner in which the women employed shall be selected. In numerous instances during the last war, women were chosen and assigned to occupations either undesirable in nature or beyond the physical capacity of the worker. A well-regulated and intelligent personnel policy will assure any railroad hiring women workers that the difficulties encountered 25 years ago will not now be repeated. A study of the reports of the Women's Service Section of the U. S. R. A. will prove a valuable guide in choosing from among the applicants who desire work.

Best of all recognitions of the value of women, and their real part in the war, lies in the fact that the War Department is now enlisting and training women to participate as active, not shielded or pampered, parts of the regular army organization.

New Books

ENGINEERING ENCYCLOPEDIA. *Published by The Industrial Press, 148 Lafayette street, New York. Two volumes. 1,431 pages, 206 illustrations, 6 x 9 in. Price, $8.00.*

The Engineering Encyclopedia supplies essential facts about 4,500 standard and special engineering subjects. In general, this encyclopedia consists of concise treatises ranging from short paragraphs to several pages in length dealing with various important mechanical laws, rules, and principles; physical properties and compositions of a large variety of materials used in engineering practice; the characteristic features and functions of different types of machine tools and other classes of manufacturing equipment.

All matter is arranged alphabetically under the heading or word likely to be referred to, thus making the Encyclopedia self-indexing. There are also many cross references to other closely allied subjects.

Locomotive Shop Kinks

A GREAT deal of thought and effort has been given to improving the facilities and equipment in the repair shops and the enginehouses of the Southern Pacific at Sacramento, Calif., also at outlying division points. The rapid and steady increase of locomotives and cars turned at various terminals, and the losses of qualified employees have made it necessary for all concerned to find some ways to expedite the repairs and servicing of this equipment in order to maintain the standard of safety and to "Keep 'Em Rolling."

As the need for quick turning of power at terminals became evident, additional oil and water columns were installed, both on the outgoing and incoming lead tracks, so that locomotives could be serviced within a short space of time. Also on main lines at passenger stations, water and oil columns were installed so that through-passenger engines could be fueled and watered on the train during the dead time of the train at terminal, without having to cut the locomotive off the train and take it to the sandhouse for this operation.

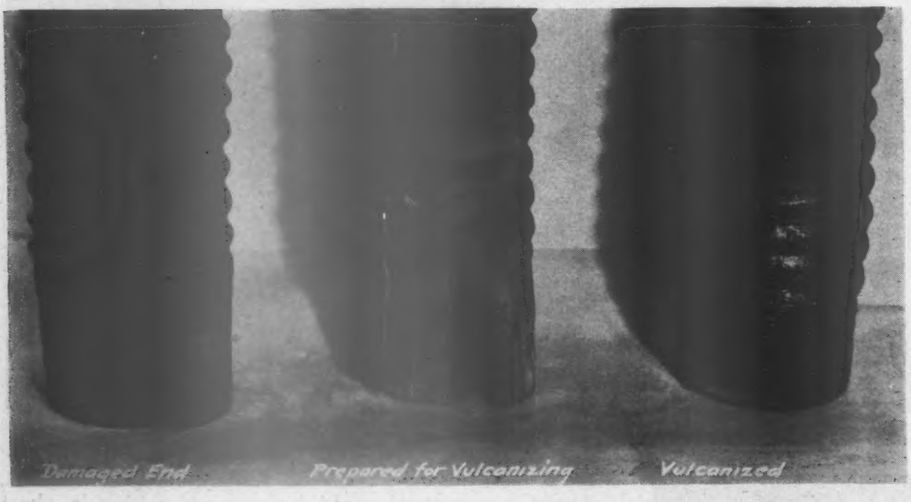
Gas cutting large steel bushings from hollow-bored driving axles

Speedmaster metal-spray machine in use at the Sacramento shops

While constant lubrication of locomotives is particularly essential on mountain territory such as encountered on the Northern district of the Southern Pacific, certain parts of locomotives difficult of access are at times neglected, which results in these parts becoming worn through lack of lubrication and having to be renewed. The S. P. found that by concentrating lubrication forces into gangs under the supervision of a lead mechanic, who is responsible for seeing that each locomotive is thoroughly and systematically lubricated, a thorough job of lubrication is assured.

In the general repair shops at Sacramento, much thought and planning has been given to substitutes for critical materials, reclamation and conservation of materials on hand, and the reclamation of scrap materials for

Concentrator which reclaims brass from foundry sand at Sacramento shops



Damaged tank hose before and after being reclaimed by vulcanizing

re-melting or re-use. Some of the most practical and most interesting are here briefly described and illustrated.

Large steel bushings are made from scrap locomotive driving axles on a machine built in the local shops. It is used for cutting scrap hollow-bore driving axles for making various bushings used on locomotives. The axle is placed on rollers on the machine and lanced with an oxygen torch as a starting point for the acetylene torch. As the axle is revolved at a uniform cutting speed, the torch cuts from outside into the hollow bore. The segment cut off is then preheated and the inside is cut out to make a proper-size bushing.

The Southern Pacific has had in use for some time a Speedmaster metal spray gun, purchased from the Master Metal Company, Inc., which is used to great advantage in reclaiming machine and locomotive parts such as monel pump shafts, electric motor armature shafts, automobile brake drums, in fact, any parts subject to wear. It has been of particular advantage in building

Complete boiler throat-sheet formed by welding together three separately flanged sheet sections

up monel feedwater pump shafts eliminating replacement of shafts of monel which it is impossible to purchase during the present emergency. Monel shafts are built up using ⅛-in. diameter stainless steel wire. This machine is also used to spray zinc on the coach steps, and miscellaneous shop tanks and vats to prevent corrosion.

The brass foundry at Sacramento supplies castings for all the Pacific Lines. Foundry sand when scrapped and sold formerly contained up to 30 per cent brass. A concentrator consists of a ball machine and cradle washer and is used to wash all sand leaving the foundry. Sand leaving the foundry now contains only about 7 per cent brass by weight. Thus, large quantities of brass formerly lost are re-used, conserving the supply.

The shortage of rubber material has increased the demands on the rubber vulcanizing department, and work is now being done that was not considered a short time ago. The S. P. is successfully vulcanizing tank hose that have been split on the ends. The same method is also used to repair rubber diaphragms used between streamline cars. To help prevent tears from progressing the full length of diaphragms, cross-strips are vulcanized on the inside at equal intervals. Shop-made equipment is also used to make repairs to tubes, tires, etc., and manufactures from scrap rubber various items such as gaskets, pipe protectors, rubber bumpers, etc.

Along this line, brake valve, triple valve, etc., gaskets are being reclaimed successfully by boiling in a cleaning solution, and then rubbing with graphite and glycerine to restore the flexibility. This process successfully raises

A door-sheet patch welded in place in the firebox

the embossing between the ports, thus reclaiming 70 per cent of the gaskets that were previously scrapped.

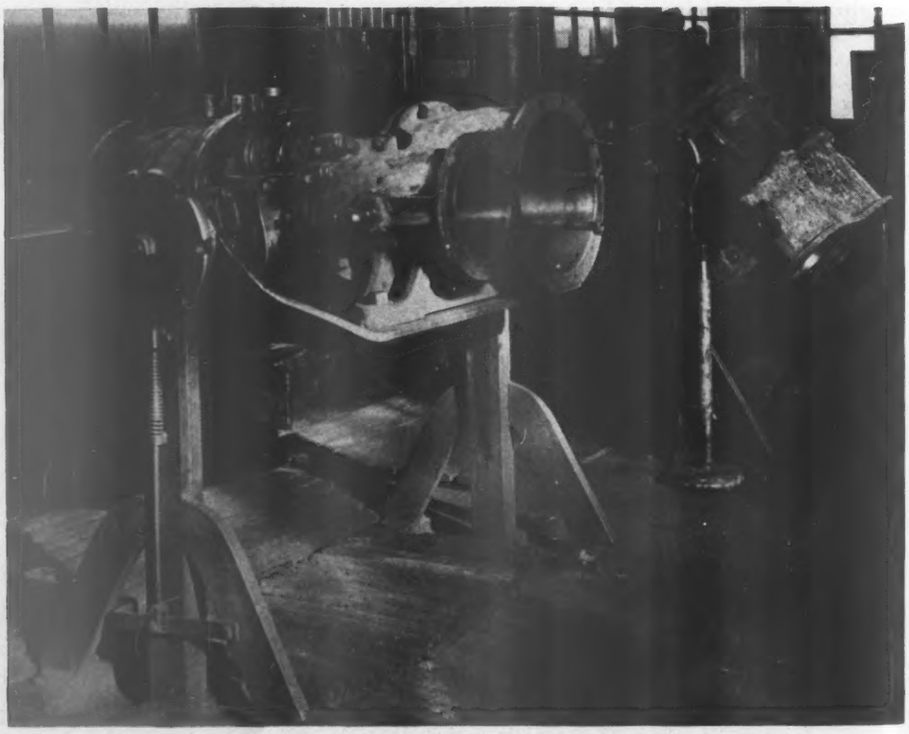
Similarly, fabrication of parts to replace steel castings on locomotives has been done for some time. Some of these items include draft castings, valve motion bearers, pilot knees, driving boxes, and guide yokes.

In connection with boiler repair work, the S. P. has recently made dies for boiler patches which are designed to be cut in two after the patches are banged. Die-flanged patches being made at the present include center and top corners of outside throat sheets, bottom of front tube sheets, top and bottom of back flue sheets, top of firebox door sheets, and mud ring corners of firebox door sheets.

A 300-ton press equipped with dies for flanging firebox door-sheet patches

Door-sheet patches, each of which is cut down the middle to make two patches

Equipment used in oxvacetvlene flame-hardening side-rod knuckle pins



Air-compressor stands which can be set at various positions for most convenient work by the repairmen

This has saved considerable time and expense in boiler repair work. For example, the patch for the top of the firebox door sheet formerly took the flange fire gang eight hours to make a single patch. Now the same gang can make 12 of the same patches in 8 hours. Furthermore, die-flanged patches are more uniform as to thickness and dimensions, and uneven heating due to hand flanging has been eliminated. A 300-ton press equipped with dies is used for making firebox door sheet patches. One of the illustrations shows the patches as flanged, later to be cut in half to make two patches. Another shows the patch welded in place.

The 300-ton press available for this work is not of sufficient size or capacity to flange whole tube or throat sheets. However, the S. P. is flanging inside throat sheets in three pieces and welding them together to make a complete throat sheet. This is an improvement over hand-flanged sheets, as well as a large saving in time and labor.

Acetylene flame-hardening tips are used to flame-

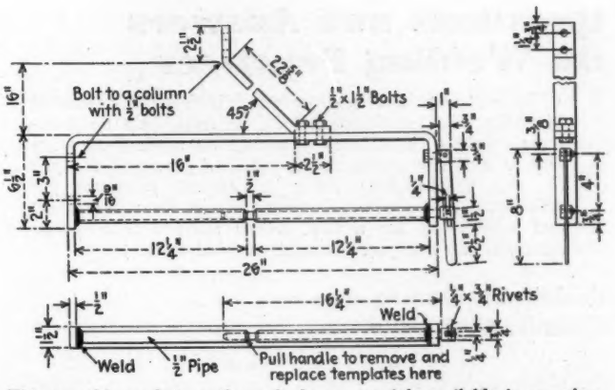
harden side rod knuckle pins. It is expected that their use will be extended to crosshead guides and various bushings as soon as proper tips are obtained.

Stands for holding air pumps when being repaired have been in use for some time. The stands can be set in various positions for the different repair operations, saving time and making work easier and handier for repairmen.

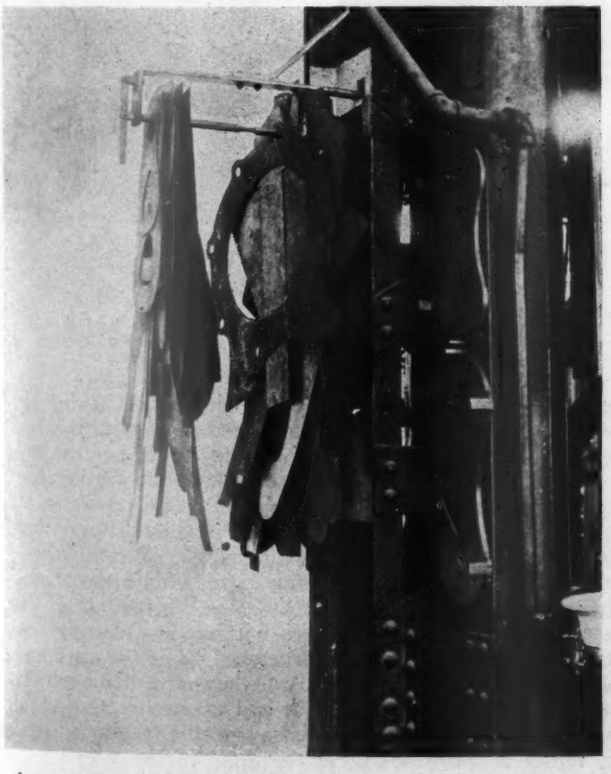
Rack for Holding Templates

At best the templates that are used around the average shop are awkward things to store. Because they are time savers, every shop has a number of them and the question is how to keep them where they are readily accessible and in as neat a manner as possible. A further requirement is that of being able to select any one that is wanted without moving most of the others. The accompanying photograph shows the device mounted on a shop column with a number of templates in the rack. The drawing shows the details of the rack. The principal feature of this rack is the support which is in two pieces; each being welded to the rack in such a manner that a ½-in. opening is left between the ends. Through one of these sections there is a rod connected to a handle on the outer end of the rack. When the handle is in the "in" position, this solid rod is long enough to protrude for a short distance into the other pipe section and close the opening. With this arrangement, it is possible to select any template, slide it over to the joint at the center of the supporting rod and open the joint by pulling the handle out. The desired template can then be removed and the rack closed by pushing the handle in.

Experience has indicated that all templates should be plainly marked with stencilled notations showing the name of the part, the drawing number from which the part is made and, possibly, the date of last revision of the drawing. Handled in this manner, it is comparatively simple for the workman to use the templates to get what he wants without any loss of time.



This template rack is easily made from materials available in any shop



Any template required is easily removed from this "home-made" rack

Locomotive Boiler Questions and Answers

By George M. Davies

(This department is for the help of those who desire assistance on locomotive boiler problems. Inquiries should bear the name and address of the writer. Anonymous communications will not be considered. The identity of the writer, however, will not be disclosed unless special permission is given to do so. Our readers in the boiler shop are invited to submit their problems for solution.)

Staybolt Breakage

Q.—We have staybolt trouble on 40-ton oil-burning Davenport locomotives. Can you give information as to why staybolts break; why some roads use a staybolt drilled through; the kind of steel to use, etc.?—F. R. D.

Staybolt breakage is due to the unequal expansion of the firebox sheet and the outside wrapper sheet because of extreme differences in temperature, typical examples of which are as follows:

Temperature of flames in firebox	1,559 F.
Temperature of fire side of firebox sheet	734 F.
Temperature of water side of firebox sheet	584 F.
Temperature of water side of wrapper sheet	385 F.
Temperature of outside of wrapper sheet	375 F.

The unequal expansion of the sheets causes the staybolts to work, tends to crystallize the metal and, in time, causes the staybolts to break. The reason for using a staybolt drilled through is to comply with Rule 26 of the Interstate Commerce Commission, which reads: "Telltale holes:—All staybolts shorter than 8 in. applied after July 1, 1911, except flexible bolts, shall have tell-tale holes $\frac{3}{16}$ in. diameter and not less than 1¼ in. deep in the outer end. These holes must be kept open at all times." In cases where the outer end of a staybolt is not accessible for ready inspection, it is customary to drill the bolt for its entire length so that the inspection can be made from the inside of the firebox. Some roads drill all rigid staybolts their entire length. Specifications for staybolt iron and steel can be found in the A. S. M. E. Power Boiler Code.

Questions and Answers On Welding Practices

(The material in this department is for the assistance of those who are interested in, or wish help on problems relating to welding practices as applied to locomotive and car maintenance. The department is open to any person who cares to submit problems for solution. All communications should bear the name and address of the writer, whose identity will not be disclosed when request is made to that effect.)

Reclaiming Damaged Cylinder Cocks

Q.—We have in our shop a number of cylinder cocks with the nipple threads broken out. Can you suggest a method of reclaiming these broken bodies?

A. The following method of repairing cylinder cock bodies has been found to be satisfactory. Several extra-heavy properly threaded nipples are made. The broken area around the nipple hole on the cylinder cock body is ground or filed bright. The new extra heavy nipple is screwed into the remaining threads and then brazed solidly to the cylinder-cock body.

Welding on Rocker Castings

Q.—Can worn trailer rocker castings, sometimes called stabilizer swing links, be economically reclaimed and what method do you recommend?

A. Worn trailer-truck rocker castings can be economically reclaimed. Both the oxyacetylene and the arc welding methods can be used, but machining costs on the arc welded area seem to favor the use of an oxyacetylene application. When gas welding these rocker castings the part is rebuilt to slightly above the required dimensions and hammered to a gage. A good grade of steel rod should be used.

Building Up Worn Coupler Heads

Q.—On page 318 of the July, 1942, issue there is a description of the manner of building up worn coupler head blocks by gas welding. What is the recommended method of doing this job by the electric arc process?

A.—Worn coupler blocks can be reclaimed by the electric arc process by merely depositing a large diameter mild steel shielded arc electrode on the worn surface. If the wear is excessive it is often more economical to weld a plate of the desired thickness over the worn surface. The plate should be ¼-in. smaller than the worn surface all around to permit sufficient weld metal to be deposited. Also allow space around the pin for welding.

Lengthening Drills By Electric Welding

Q.—On page 317 of the July, 1942, issue there is a description of the manner of welding an extension shank on a drill by the gas process. Can this job be done by electric arc process?

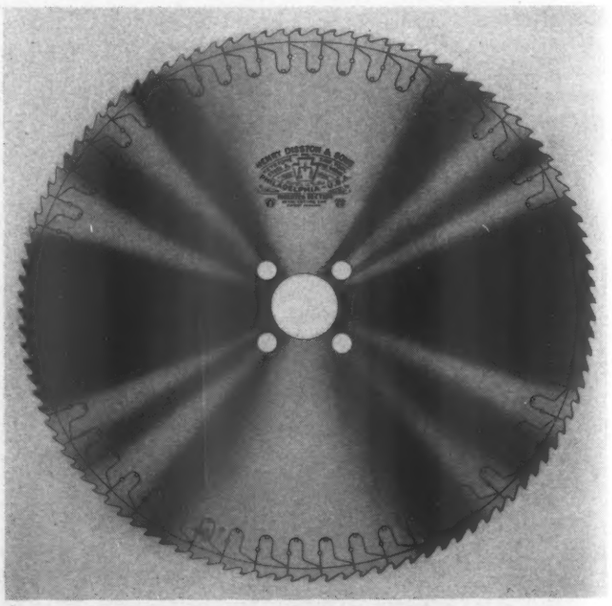
A.—Either carbon or high-speed drills can be welded to a long shank by the electric arc process. Both the drill and the shank should be prepared by grinding to a flat double vee. Provided the drill and the shank are the same diameter, they should be placed in the trough of an angle in order to insure alignment while welding. Should one be smaller than the other, shims should be used to obtain proper alignment. Always make certain that the drill is straight.

On carbon steel drills weld one side completely using a ⅛-in. mild steel shielded arc electrode and then repeat on the other side. After welding, the tool should be allowed to cool slowly.

On high speed drills it is advisable to cool the welded car by placing it in dry asbestos or lime. While a mild steel shielded arc electrode will usually prove satisfactory in welding high speed drills, for best results an 18-8 stainless steel electrode is recommended on account of its high ductility.

Improved Inserted Tooth Metal Cutting Saw

A recent development in circular metal-cutting saws, combining the advantages of both the inserted tooth type and solid tooth type has been made by Henry Disston & Sons, Inc., Philadelphia, Pa. It is a continuous-rim saw with inserted sections rather than inserted teeth—a saw that can be readily sharpened on an automatic grinder. This saw provides a maximum number of teeth for any given diameter and makes extremely smooth cuts. It can be operated at speeds up to 5,000 ft. per min. The design permits a thinner blade and



Inserted sections permit thinner blade and narrower kerf in this metal-cutting saw

cutting edge than is customary with saws having individual inserted teeth and the kerf is narrower which means that less power is required to drive the saw.

The design of the inserts is such that the cutting load is transmitted from each insert directly to the blade approximately at right angles to the resultant force, and not to adjacent inserts or to the rivets. The full thickness of the blade extends to the extreme diameter, thereby giving maximum support to the inserts but at the same time it permits long life without any cutting into the projections when sharpening. The inserts are quickly and easily replaced if they are damaged by accident. Special emphasis is laid upon the fact that it is not necessary to return this saw to the factory to have it refitted. Such work can be done in the user's own factory, or some nearby saw repair shop.

Conditioning Passenger Cars for Troop Movement

In a recent circular letter to voting and associate members, the A. A. R., Mechanical Division, reports that a number of troop trains originating at army camps and delivered to connecting lines have a large number of brake shoes worn completely out and a portion of the cars have UC brakes set in direct release position and others in graduated release position, necessitating delays to trains enroute in order to apply brake shoes and change the brake settings.

In order to expedite the movement of troops and their equipment, the Mechanical division recommends that the brake equipment on cars used in this service be prepared and adjusted at originating points before being set for loading so as to insure their movement over maximum distances without further adjustments. This can be accomplished by compliance with the following instructions which are not inconsistent with recommendations "governing the operation of passenger cars in freight trains," circular DV-846 of May 27, 1935:

Brake equipment should be "in date" and in proper operating condition.

Brake shoes should be new or in sufficient thickness to complete the trip to final destination.

Slack adjusters (when cars are so equipped) should be adjusted to provide maximum take-up before requiring readjustment.

Piston travel should be not less than nominal nor more than one inch greater than nominal.

Passenger cars having graduated release feature must have this feature cut out for movement in freight trains.*

The time and labor involved in disconnecting the emergency reservoir and plugging the connections or removing the protection valve springs on the U. C. equipment in cars to be handled in freight service and recoupling them upon the return of the car to passenger service is not justified by service performance.

The water-raising system on passenger cars, when handled in freight service should be cut out when conditionings permit and a cut-out cock is available in the water system supply pipe.

The method of handling mixed trains is primarily the responsibility of each individual carrier in accordance with standard train handling instructions. The above instructions were prepared by the A. A. R. Committee on Brakes and Brake Equipment.

* Where mixed trains are involved, having more than 25 cars, instructions as above should be observed. Where mixed trains are involved, having a total of 25 cars or less, they may be operated in the conventional manner without any special changes or provisions. No change is recommended in the standard setting of the safety valves from 60 lb. or any other value.

A.A.R. Arbitration Report for 1942

During the year, Cases 1786 to 1788, incl., have been decided. A vote of concurrence in the decisions is respectfully requested by the Arbitration Committee.

As a result of letter ballot action last year, a new requirement of Rule 3 was approved to make mandatory the use of standard extra heavy air-brake pipe on cars built now or rebuilt on or after January 1, 1942. To provide for cars ordered for delivery in 1941, construction of which was unavoidably delayed, this effective date was advanced to September 1, 1942. No further extension on this account appears necessary and none is recommended.

With the approval of the General Committee, all car owners were notified under date of September 24, 1941, that no extension beyond January 1, 1943, would be granted for the requirement appearing in Par. (b-8) of Rule 3 providing that all cars must be equipped with A.A.R. recommended practice or A.A.R. approved equivalent design of bottom-rod and brake-beam safety support, to be acceptable from car owner; and that this provision would become a general interchange requirement effective July 1, 1943. Notice to this effect also appeared in the 1942 Code. No requests have been received for an extension of these dates. This is a safety measure and it is recommended that no further extension be granted.

It is also recommended that no extension beyond January 1, 1943, be granted for requirement appearing in Par. (j-2) of Rule 3, prohibiting acceptance from the owner of cars not having journal-box packing prepared and boxes repacked in accordance with the A.A.R. standard. With the approval of the General Committee, announcement of this intent appeared in the 1942 Code and a circular letter dated January 9, 1942, was transmitted to the members and all private-car owners with respect thereto. The use of journal-box packing which does not meet the requirement is one of the factors which adversely affect the availability and service performance of freight cars.

A new requirement is added to Rule 3 to make mandatory the use of A.A.R. standard three-position, double-spring-type, pressure-retaining valves on cars built new or rebuilt on and after January 1, 1943, and to provide for use of the recommended practice four-position-type retaining valve and standard valve converted to four-position type, as recommended by the Committee on Brakes and Brake Equipment and approved by letter ballot.

[The committee recommended the extension in the effective dates from January 1, 1943, to January 1, 1944, of the following requirements in the present rule: Brake levers—metal badge plates; braking power—braking ratio; couplers having 5-in. by 5-in. shanks; couplers having 5-in. by 7-in. shanks; application of welded T- or L-section truck sides; tank cars—metal placard holders; Class E-3 cars not to be accepted from owner.—EDITOR.]

It is recommended that Rule 5 be modified to prohibit billing for correction of wrong repairs to brake levers, brake rods, carrier irons, draft stops, side bearings and door fixtures, after one year from date of such wrong repairs, it being considered that the car owner has received sufficient service from these items within the period specified to justify the cost thereof. Rules 87 and 94 are modified to harmonize.

A new paragraph is added to Rule 17 to permit substitution of one type of recommended practice or approved equivalent design of bottom-rod and brake-beam safety support for another, as correct repairs, the cost thereof to be restricted to the cost of the device which is standard to the car, as a safety measure and to expedite repairs to foreign cars during the emergency period. This recommendation has the concurrence of the Committee on Car Construction and the Committee on Brakes and Brake Equipment.

New requirements are recommended for incorporation in Rule 17 to permit substitutions as correct repairs of various designs of truck bolsters and cast-steel frames of the same capacity where the truck can be made safe and serviceable, in order to expedite repairs to foreign cars and avoid holding cars out of service.

A modification of Rule 32 is recommended, to provide determination of responsibility for damage caused by failure to properly control cars with car retarding device. Responsibility shall be based on the extent of damage incurred, similar to the basis now provided for damage to cars in impact switching service.

Changes in Rules 9, 56, 57, 62 and 101 are recom-

mended, to provide for the use of air hose spliced in accordance with A.A.R. specifications on cars in interchange service, as recommended by the Committee on Brakes and Brake Equipment.

Modifications of Rules 60 and 66 are recommended, to prohibit shopping of loaded cars with operative overdate air brakes or journal-box packing until the cars have reached destination and been unloaded, as a temporary measure for the duration of the war emergency, to prevent delays to important loaded cars for periodic attention to these details when in operative condition.

Recommendation is offered for modification of Rule 63 to make mandatory the application of brake-head wear plates where the distance between lugs has reached 2⅛ in. but less than 2⅜ in., in order to increase the service life of brake heads and thus conserve material.

With the approval of the Committee on Wheels, Rules 73 and 73-A are consolidated as new Rule 73 covering out-of-round and worn-through chill wheels, and a note has been added to indicate that the out-of-round gage is not intended for use in train yards and to provide that condemnation of wheels by use thereof must be confined to shop and repair tracks.

Upon recommendation by the Committee on Car Construction, modification of axle condemning limits in Rules 85 and 86 are offered, brought about by a change in design of journal bearings.

It is recommended that Par. (d) and Interp. No. 2 of Rule 87, which permit the car owner to require cancellation of charges for wrong repairs indicated by billing repair card only, be eliminated. Charges are being cancelled under this rule for substantial and permanent repairs which are seldom corrected by the car owner. The change recommended will not prevent the use of joint evidence for wrong repairs when correction is necessary.

Spring Snubbers On Tank Cars

The A. A. R., Mechanical Division reports that the subject of spring snubber application to tank car trucks was considered at a conference in Chicago on August 12 of representatives of the American Petroleum Institute, the A. A. R. Committee on Couplers and Draft Gears, the Arbitration Committee, the Committee on Tank Cars, the A. A. R., Car Service Division, local railroad mechanical committees from loading and destination areas for tank-car movements to the eastern seaboard, and a number of other representatives of tank-car operators.

At this conference, the matter of train partings causing extensive delays and hazards to trains of tank cars was thoroughly discussed, also tests recently conducted by the Committee on Couplers and Draft Gears to develop the cause of these train partings. The instrument records of these tests showed graphically the bounce of tank cars when not equipped with snubbers and in comparison with other types of cars, and supported the conclusion that this car bounce due to harmonic spring action at speeds above 40 miles an hour, is the principal cause of train partings. In these same tests, it was brought out that the condition of uncoupling rigging is also a contributory cause for train partings.

After thorough consideration, the conference unanimously approved a proposition to apply spring snubbers to all tank cars not now so equipped, as rapidly as the material can be made available and in the national interest, with particular reference to providing an uninterrupted flow of petroleum products to the eastern seaboard. The Mechanical Division has issued a circular reproduced below requiring the application of snubbers to all tank cars and asked the individual car owners to indicate their willingness to support the snubber application program and permit railroads to apply snubbers which will be billed for on the basis of charges and credits specified in the Interchange Rules.

Records maintained by a number of railroads are said to show that, in addition to train partings, the next most prolific cause of shopping of tank cars and resultant loss of car days is broken truck springs and the application of spring snubbers will materially reduce this truck spring breakage and also this cause of loss of car days.

How the Spring Snubbers Are To Be Applied

Spring snubbers are to be applied by tank-car owners whenever a tank car reaches their shop tracks for any repairs; by tank-car owners at loading or unloading points, either by their own forces or a delegated agency; by railroad companies whenever a tank car is on their car repair tracks. Tank car owners may notify railroad companies of their preference in one-two-three order of types of snubbers desired and railroads should comply with this as far as material in stock will permit. Substitution of recognized types of snubbers is permissible; tank cars that are equipped with snubbers should be so stenciled at both ends of cars; and charges and credits should be on a basis of the A.A.R. Rules.

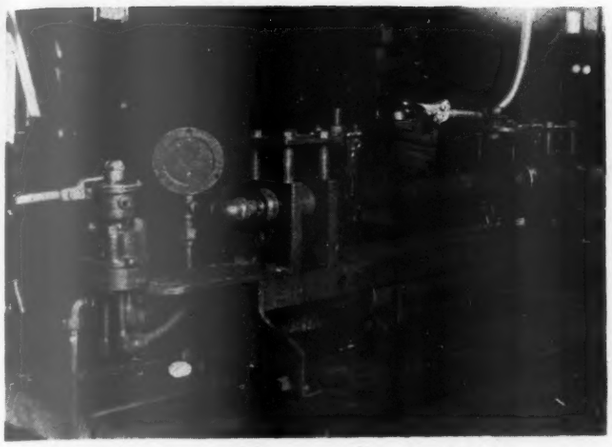
The matter of obtaining such spring snubbers for tank car trucks has been taken up with the War Production Board who advise that, in order to obtain this material, the car owners should apply on a PD-1A form for the necessary preference rating. In making such application to the War Production Board, it is suggested that the following uniform answer be given to explanation No. 2 on this form:

"These snubbers required to help eliminate delays in movement of tank cars due to trains parting and shopping enroute on account of broken truck springs. Tests have developed that application of snubbers will eliminate this trouble to a large extent and permit greater utilization of tank cars. This program is sponsored by the Association of American Railroads, American Petroleum Institute, Office of Defense Transportation and Office of Petroleum Coordinator."

Air-Hose Testing Device

An air-hose testing device, developed and successfully used at the South Louisville, Ky., shops of the Louisville & Nashville, is shown in the illustrations. Prior to the present need of drastic steps in saving rubber, it was the practice on the L. & N., like many other roads, to discard rubber air hose on an age and condition basis, after having stripped off the metal connections. With about 8,000 hose of this character on hand, it was decided to test and reclaim as many as possible in the interests of rubber conservation.

In order to save the expense of mounting the hose with fittings and testing them on a conventional machine, the L. & N. developed the tester, illustrated, which consists of a bench-mounted channel-iron section with end-supporting brackets bolted to the bench, equipped with the necessary hose-supporting nipples, air-operating cylinders, air brake control valve, pressure gage, wire-

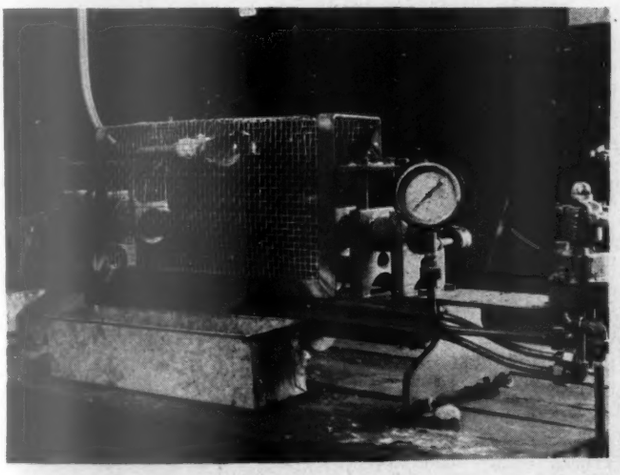


Rear view of the testing machine with safety guard removed to show the construction

mesh safety guard and galvanized iron pan used to hold the soapy water required for testing. An electric light extension, conveniently located just over the center of the hose, assures adequate visibility on dark days or whenever for any reason shop lighting conditions are unsatisfactory.

In testing each stripped hose, one end is applied over a fixed hollow nipple in one of the head blocks (the nearer one in the illustrations) and operation of the brake valve handle to the first position admits air to a small air cylinder in the opposite head block and forces out a piston and long nipple which enters the other end of the air hose. The long cylinder shown underneath the base channel is equipped with double-acting pistons which pull two short pieces of ⅜-in. steel cables tightly around the hose, one at each end, when the brake valve is moved to the second operating position. Each cable is firmly fixed at the top and extends entirely around the hose, making a tight fit on the nipple whenever air pressure is applied.

With the hinged safety guard in position, the next



Air-brake hose testing machine used at the South Louisville shops of the L. & N.

movement of the brake valve handle admits high-pressure air to the hose and, when no major failure of the hose occurs, the guard is turned up out of the way and a brush used to apply a soap-suds test to the hose for leaks, using the drip pan shown in one of the illustrations. Reverse movement of the air brake operating handle releases the air pressure and holding cables and withdraws the nipple so that the hose can be removed from the machine and another one applied. Of the 8,000 air brake hose mentioned, 2,450 were reclaimed for further use.

Location of Angle Cocks

In a circular letter, dated August 25, the A.A.R. Mechanical Division calls attention to the recommended location of angle cocks on freight cars as 12 in. out from the center line of car, 15 in. back from the draw face of the coupler and 1½ in. below the center line of the coupler (Page E-28-1942 of the Manual). This also allows a variation from the preferred location based on the formula C equals 39 in. minus 2 B, with maximum and minimum limits of 15 in. and 12 in. on C.

A recent check of hose removals by representatives of the Committee on Brakes and Brake Equipment indicated a high percent of hose being removed due to damage near the nipple end caused by a partial passing of the couplers.

In the interest of conservation of rubber, it is recommended that the angle cocks be located at the preferred location on all new cars, and that they be relocated to this location on existing cars when rebuilt or on repair track for other repairs.

Air Brake Questions and Answers

HSC High-Speed Passenger Brake Equipment

98—*Q.—How does it operate?* (See Q. 96 and 97, page 397, September issue.) A.—To establish battery supply to the relay magnets when a brake application is made.

99—*Q.—Where is the A-2 continuous quick service valve connected?* A.—To the brake pipe and straight air pipe (Fig. 15).

100—*Q.—What does this valve consist of?* A.—A body *2* (Fig. 8) attached to the pipe bracket *35* by studs and nuts.

101—*Q.—What does the pipe bracket contain?* A.—A quick service volume, two strainers and a choke.

102—*Q.—What service do the two strainers perform?* A.—Strainer *39*, which is the same as that used in the AB valve and the D-22-BR valve, strains the air taken from the brake pipe to supply the quick service volume. Hair strainer *55* is located in the exhaust opening serving to protect the opening from dust and insects.

103—*Q.—What is the purpose of the choke and where is it located?* A.—Choke *51* provides a controlled rate of brake pipe reduction with the valve in application position and is located in the face of the bracket.

104—*Q.—What is contained in the body?* A.—A piston *8* with a packing ring, a slide valve *7*, a diaphragm *14* and strut *13*, charging choke *3* and the cut off valve portion.

105—*Q.—What does the cut off valve portion consist of?* A.—Diaphragm *22*, mounted on a follower *23*, into which is screwed a hollow guide *26*, enclosing a cut off valve *27* with spring *28* and spring *29*.

106—*Q.—With no pressure in the straight air pipe, what is the position of the parts?* A.—The diaphragm is held released by spring *29*, which unseats the cut off valve, opening the exhaust to the brake pipe passage.

107—*Q.—When is the cut off valve seated?* A.—When the HSC valve is applied in excess of 5 lb. straight air pipe pressure, this pressure deflects the diaphragm and seats cut off valve, closing the brake pipe passage to the exhaust.

108—*Q.—In what way does this affect the function of the quick service valve?* A.—This nullifies the function of the quick service valve as long as the straight air brake is effective.

109—*Q.—What harm results in the event that small local fluctuations of the brake pipe cause the piston to move?* A.—None. The ensuing brake pipe reduction is prevented by the closed cut off valve.

Combined Auxiliary, Emergency and Displacement Reservoirs

110.—*Q.—Why are these reservoirs combined in one structure?* A.—In order to afford minimum space for installation and keep the weight as low as practical.

111—*Q.—Explain the functioning of the displacement reservoir.* (Fig. 4) A.—As previously explained this reservoir provides the required operating volume to develop the proper relation of brake pipe reduction. The control valve operates to admit to or exhaust air from the displacement reservoir.

112—*Q.—What controls the application and release rates?* A.—Chokes 8 and 7 in control valve pipe bracket.

113—*Q.—In this respect does this equipment correspond with previous equipment?* A.—No. On previous equipment the triple or universal valve applies and releases directly to and from the brake cylinders.

114—*Q.—Explain in detail the difference between the old and new equipment.* A.—When a brake application is made with the previous equipment the first few pounds of build-up in the brake cylinder is consumed in replacing the partial vacuum created by the movement of the brake cylinder piston from release to application position. The action of diaphragm *4* and spring *7* duplicates this condition on the new equipment. When a brake application is made the diaphragm is deflected (Fig. 4, lower view), increasing the volume so that the initial rate of pressure development is uniform with that of existing brake equipment.

115.—*Q.—How does this control valve compare with the D-22-AR and D-22-A control valves?* A.—The D-22-BR valve is the same as the AR valve with the addition of a double check valve portion (*225,* Fig. 3) on the front face of the pipe bracket.

116—*Q.—What is the purpose of the check valve?* A.—It interlocks the HSC electro-pneumatic and automatic brake systems, permitting operation of either system as control from the brake valve on the power unit.

117—*Q.—How does the D-22-AR compare with the D-22-A control valve?* A.—The same, except that the AR valve has the release interlock valve portion.

118—*Q.—What does this portion control?* A.—The graduated release and the quick re-charge features.

119—*Q.—What does this portion consist of?* A.—A piston *182,* pinned to a slide valve *183* and held to its seat by a spring *187* through a strut *185.* The slide valve has two positions on its seat between interlock diaphragm *180* and spring *191.*

120—*Q.—To what is the face of the diaphragm connected?* A.—Displacement reservoir pressure.

121—*Q.—Explain the operation.* A.—With less than 6 lb. displacement reservoir pressure, spring *191* holds the piston and slide valve in forward position where the slide valve prevents flow from the emergency to the auxiliary reservoir, and requires a movement of the service slide valve to move the release piston to close the displacement reservoir exhaust. With approximately 10 lb. displacement reservoir pressure, the spring is overcome and the diaphragm is deflected, moving the piston and slide valve to the rear position, where a slide valve cavity connects the emergency to the auxiliary reservoir, thus providing a quick recharge and graduated release function under the control of the service piston and graduating valve.

122—*Q.—What prevents back flow from the emergency to the auxiliary reservoir?* A.—Check valves *73* and *195* in the emergency reservoir charging passage.

123—*Q.—Does this feature stabilize the service piston?* A.—Yes, especially where the control valve is used with the HSC brake system.

124—*Q.—Explain the operation.* A.—During electro-pneumatic straight air brake application of the system, the auxiliary reservoir pressure is reduced into the straight air pipe, the higher brake pipe pressure thus holding the service piston in release position. With the emergency reservoir positively cut off from the auxiliary reservoir by the release interlock valve, the reduction is effectively obtained on the smaller volume of the auxiliary reservoir alone, in this way assuring a high differential of brake pipe pressure to hold the service piston in release position.

Operation

125—*Q.—Describe the initial flow of brake pipe air at the BR control valve.* A.—Referring to Fig. 17, air from the brake pipe flows through the branch pipe combined dirt collector and cut out cock, through the filter *12* and to chambers *A* and *B* on the face of the service piston *93* and emergency piston *35.*

126—*Q.—What movement of the pistons then occurs?* A.—They both move to release position.

127—*Q.—With the service piston in this position what ports does it uncover?* A.—In this position the piston uncovers the charging choke *83* and charging ports *X* in the piston bushing.

128—*Q.—What communications are open between brake pipe and auxiliary reservoir via chamber A on the face of the service piston?* A.—(1)—Through choke *83* to service slide valve chamber *C,* thence through passage *5g,* release slide valve chamber *D* and passage *5* to the auxiliary reservoir. (2)—Through charging ports *X,* passage *5f,* choke *81,* past check valve *73,* passage *5g,* release slide valve chamber *D* and passage *5* to the auxiliary reservoir.

Tank Car Repairs Promptly Made

Railroads engaged in handling the East Coast petroleum movement are encountering delays to trains by reasons of cutting out tank cars enroute for various equipment defects. According to a circular letter recently issued by the A. A. R. Mechanical Division, an analysis on one railroad indicated a total of 4,262 cars shopped in one recent month. The defects for which these cars were shopped were as follows:

Trucks (other than wheels)	1,382 cars,	or	32.4 per cent
Wheels, cast-iron	1,237 cars,	or	29.0 per cent
Wheels, wrought-steel	5 cars,	or	.0 per cent
Couplers, draft gears and attachments	596 cars,	or	14.0 per cent
Air brakes	430 cars,	or	10.1 per cent
Miscellaneous	612 cars,	or	14.5 per cent
Total	4,262 cars,	or	100.0 per cent

To overcome this situation, large accumulations of defective cars in the loading areas must be prevented

(*Continued on next left-hand page*)

The manufacture of chilled car wheels is no exception. Under our wheel exchange plan, by which you receive new wheels for old on a conversion charge basis, discarded chilled wheels are speedily melted and recast into new and better wheels for your freight cars.

You can help conserve vital metal, speed delivery of new chilled car wheels, keep defense production rolling to its destination and help hasten victory, by immediately returning every scrapped chilled car wheel to one of our foundries. ***Make your scrap give the Axis a rap!***

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS

230 PARK AVENUE,
NEW YORK, N. Y.

445 N. SACRAMENTO BLVD.,
CHICAGO, ILL.

AMCCW

ORGANIZED TO ACHIEVE:
Uniform Specifications
Uniform Inspection
Uniform Product

and, as far as possible, the shopping of cars (both loaded and empty) while en route eliminated. The following procedure is recommended by the A. A. R., Mechanical Division.

Inspection Prior to Loading and After Unloading

All cars must receive a close inspection, prior to loading, either by the car owner or the railroad. Where the car owner has repair facilities available, all necessary repairs should be made by him to such an extent that the cars may reasonably be expected to carry their loads to destination without delay enroute for repairs or transfer. In the absence of repair facilities by the car owner, the railroad serving the industry must take cars to its nearest repair track and make all necessary repairs to the above extent.

All cars must receive just as close an inspection after being unloaded and, if defective, repaired to the same extent, as in the loading area. It is just as essential that the empty cars move to destination without shopping for mechanical defects during the trip as for the loaded cars to do so.

All tank cars found in a leaky condition at destination should be repaired before being returned to loading points. When repairs to the tank shell are required, due attention should be given to anchorage and to underframe when required. Effective at once, Interchange Rule 2 (Par. 3, Sec. (b)) is modified to read as follows:

"Any leaky tank car, regardless of commodity carried, shall have stenciled on both sides, in letters three inches in size, adjacent to the car number, the words 'Leaky tank. Do not load until repaired,' and at the location of the leak the symbol 'X'; and the owner shall be immediately advised *by wire,* stating definitely location of leak and point at which empty car is held. *Owner shall furnish disposition by wire within 48 hr.* Stenciling must not be removed until the tank is repaired. No charge shall be made for this stenciling."

Where it is found necessary to shop cars while in transit, repairs to an extent that car may reasonably be expected to move to destination without additional repairs, should be performed with the least delay possible.

Railroads should, as far as practical, confine their inspection to one point on the railroad where cars are received, and there provide facilities to condition the cars to go to destination without further detail inspection.

Scope of Inspection and Repairs

Particular attention is directed to the necessity for maintaining couplers and attachments, draft gears, brake beams, brake beam hangers, pins and other attachments, hand rails, air brake piping, side bearings and side bearing clearances, in a proper state of repair at all times.

The condition of uncoupling levers and attachments should be carefully checked, with special attention to any condition which may cause the coupler lock to lift accidentally as a result of longitudinal or lateral movement of the coupler head. Type *D* coupler lock lifters should be examined and the No. 3 type lifter applied to couplers not so equipped.

Dome covers, safety valves, outlet valves, outlet valve caps and heater pipe caps must be carefully checked. Many cases have been found where threads on the end of the outlet pipe are so badly worn it is practically impossible to hold the caps secured in their proper places. Air brakes must be checked to ascertain if in operative condition and not overdue for periodic attention.

Particular attention should be given to journal box packing. On cars not due for periodic repacking, the boxes should be carefully examined and packing adjusted or boxes repacked as found necessary. Free oil may be used in accordance with the instructions of individual railroads or car owner. This attention should also be given to loaded cars in train yards. When cars are overdue for periodic attention, it is important that the requirements of Rule 66 be fully complied with, using materials meeting the A.A.R. specifications for new car oil; renovated car oil; new waste for journal box packing and renovated journal box packing.

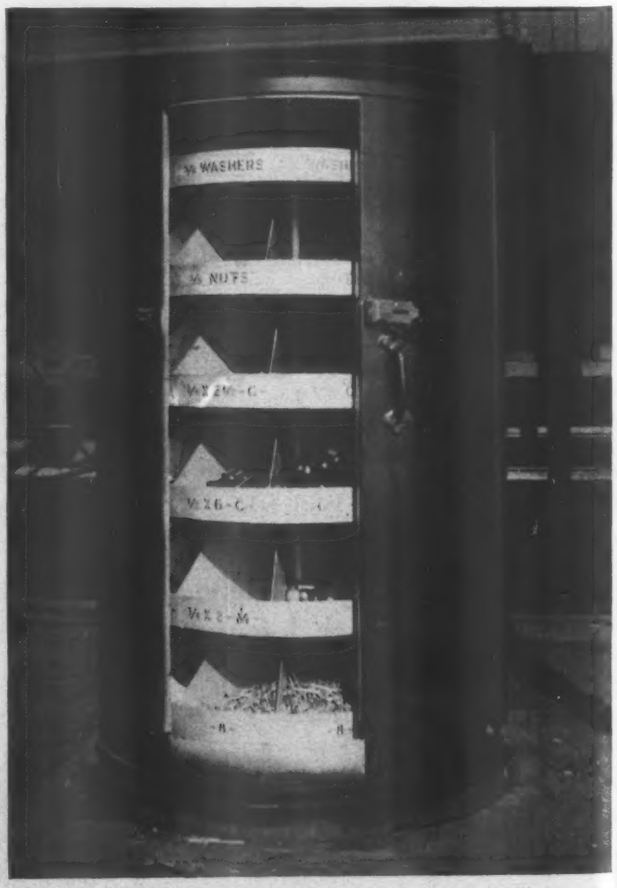
Substitutions of Materials

Full advantage should be taken of substitution of materials as provided for in the A.A.R. Interchange Rules, rather than to hold cars out of service awaiting material. Particular attention is directed to new sections (m), (n) and (o) of Rule 17 appearing in Supplement No. 1 to the current Code of Rules with respect to bolsters, side frames and safety supports. Also, to modified Rule 23 which will appear in Supplement No. 2, effective September 1, 1942, and will permit more extensive repairs to car parts by welding.

When necessary to order materials from car owner during the present emergency, such orders should be submitted by wire and shipment must be made without delay via express or truck.

The Mechanical Division suggests that railroads survey their operation to ascertain if certain items (such as side frames or bolsters) are failing to an extent where it would expedite car movement if the owner would stock these items at strategic points on the railroad and arrange with the car owner to do so.

* * *



A small circular material rack built of light steel which is particularly suitable for use out of doors—The door slides on rollers and the shelves are supported by a vertical telescoping pillar which permits them to rotate easily on ball bearings—A hasp is provided for the padlock—The rack is in use on the Great Northern

(*Turn to next left-hand page*)

NO FREIGHT MOVES TILL THE LOCOMOTIVE MOVES IT!

To move long, heavy freights, and to keep 'em rolling on fast, wartime schedules, demands the extra power that Modern Super-Power Steam Locomotives give so efficiently and economically.

Those farsighted and courageous railroads that insisted on building up a fleet of modern, high-speed, high-powered locomotives are today most successfully playing their part in moving the greatest volume of freight ever known.

Lima-built Modern Super-Power Steam Locomotives are aiding many of these roads to set new all-time highs in gross ton-miles per train-hour.

LIMA LOCOMOTIVE WORKS LIMA LOCOMOTIVE WORKS INCORPORATED INCORPORATED, LIMA, OHIO

High Spots in
Railway Affairs . . .

Woman Workers On Railroads

Increased railroad business, the selective service draft, and opportunities in the war industries, are making the personnel problem on the railroads one of increasing difficulty. More and more women are being taken into the service in those occupations for which they are best equipped. It appears now, however, that it will be necessary to use women in some of the heavier occupations, in which they have not ordinarily functioned, or at least since the first World War. The British railways were forced to take this step a long time ago. The Office of Defense Transportation, on September 15, sent Dorothy M. Sells, chief of the Personnel Supply Section of the Division of Transport Personnel, to England, to make a first-hand study of how the women are being used in the British transportation industry. It is expected that this survey will require at least two months.

Oil for the East Coast

For the week ended September 5 the railroads handled an average of 824,850 barrels of oil daily to the East Coast. This is a far cry from the 1941 average of only 11,250 barrels of oil per day—a really spectacular and outstanding accomplishment, considering the condition of the railroad tank car equipment and all of the operating problems involved, at a time when the railroads are being forced to handle a record-breaking freight and passenger business. Even with this remarkable improvement there promises to be a shortage of oil for heating purposes on the East Coast this winter. The construction of pipe lines is being rushed, in order to shorten the hauls of the railroad tank cars, and this promises to bring some relief, if the job can be completed before extreme cold weather sets in.

No Football Specials

Director Eastman of the Office of Defense Transportation, issued a statement on September 13 to the effect that no special train or bus service to football games or other sports events will be permitted this fall and winter. He also indicated that his office was taking steps to prevent the overcrowding of regular trains serving areas in which such events are to be held. Passenger travel on public carriers has increased 100 per cent over a year ago and week-end congestion on both trains and buses has become a serious problem in all parts of the country. "For these reasons," says Mr. Eastman, "the customary heavy train and bus travel to football games and similar events is out of the question this year." The colleges are being asked to co-operate in making arrangements for the transfer of scheduled games to centers of population, so that a minimum of transportation will be required.

Traffic in 1943

M. J. Gormley, executive assistant of the Association of American Railroads, in an address before the Great Lakes Regional Advisory Board, predicted an increase in railroad passenger and freight traffic in 1943 of 15 per cent over 1942. Incidentally, Mr. Gormley estimates that the railroad freight traffic in 1942, measured by the number of tons hauled one mile, will be about 30 per cent greater than in 1941, and that the railroad passenger business, measured by the number of passengers carried one mile, will be approximately 50 per cent greater this year than in 1941. On this basis, the estimated increase next year will not be as great as the increase in traffic in 1942 over 1941. Mr Gormley pointed out that, "War production is certain to increase. Troop movements will increase as our army and navy are enlarged. Passenger business will go up as the use of rubber-tired and gasoline-driven vehicles decreases. The railroads will continue to handle such unaccustomed loads as the oil movement to the East and the all-rail movement of coal into New England. On the other hand, civilian production will probably fall to minimum levels in 1943."

Post-War Planning

We have changed from a peace-time to a war-time economy. If we are to meet the 1943 program for war materials it will require such a large part of our production facilities that we shall have to reduce our standard of living to almost a bare subsistence basis, although, fortunately, we will be able to coast along fairly well for some time on our present facilities and conveniences. When peace comes we shall have to make a drastic shift back to a new economy. Returning service men must be given employment and, in fact, if we are to enjoy prosperity we must effectively solve the unemployment problem. We did not make a very good job of this in pre-war days, and certainly we must make a better job of it when the war is over. In spite of the demands of the present war emergency, there are today in this country well over 100 organizations, governmental and private, that are engaged in post-war planning; this does not take into consideration a great number of individual industries that are engaged in special research and planning in their own specific fields. Some of these companies have large staffs busily engaged on such studies. Because of political factors that may enter into the situation, it behooves all intelligent people in this country to take an interest in these matters, so that when they come up for public discussion, wise counsel will prevail and politicians, ignorant of the economic principles involved or out to feather their own nests, may be curbed.

Train-Limit Laws Canceled

Railroad operation, even under normal conditions, has been hampered by train-limit laws, adopted by some of the states. Under war conditions they have seriously affected the efficiency of operation. In an order, effective September 15, the Interstate Commerce Commission directed the railroads to disregard these state train limit-laws "when necessary for the prompt movement of freight and the clearing or avoidance of congestion by either freight or passenger trains". Only the states of Oklahoma and Arizona are affected. It is understood that the Office of Defense Transportation is in agreement with the I. C. C. action.

Railroad Executive Rubber Administrator

This country was caught badly off its guard in not having made early and more adequate provisions to insure a reasonable supply of rubber for war and civilian purposes. Conditions have become such that it is necessary to take drastic action. A special investigating committee, appointed by the President and consisting of Bernard M. Baruch, chairman; James B. Conant, president of Harvard University, and Karl T. Compton, president of Massachusetts Institute of Technology, recommended that the WPB appoint as rubber administrator a man of "unusual capacity and power," giving him "full and complete authority in regard to the manufacture of synthetic rubber, including research, development, construction and operation of plants." It is a tough job and at this juncture no chances can be taken in experimenting with a man about whose ability or performance there is any question. Donald M. Nelson, chairman of the War Production Board, in selecting a man "who can do any kind of a tough job," turned to William M. Jeffers, president of the Union Pacific. The appointment was made on September 15 and Mr. Jeffers immediately started to work to lick the problem—a problem which, at the moment, is undoubtedly about the toughest with which any one man in this country can be confronted.

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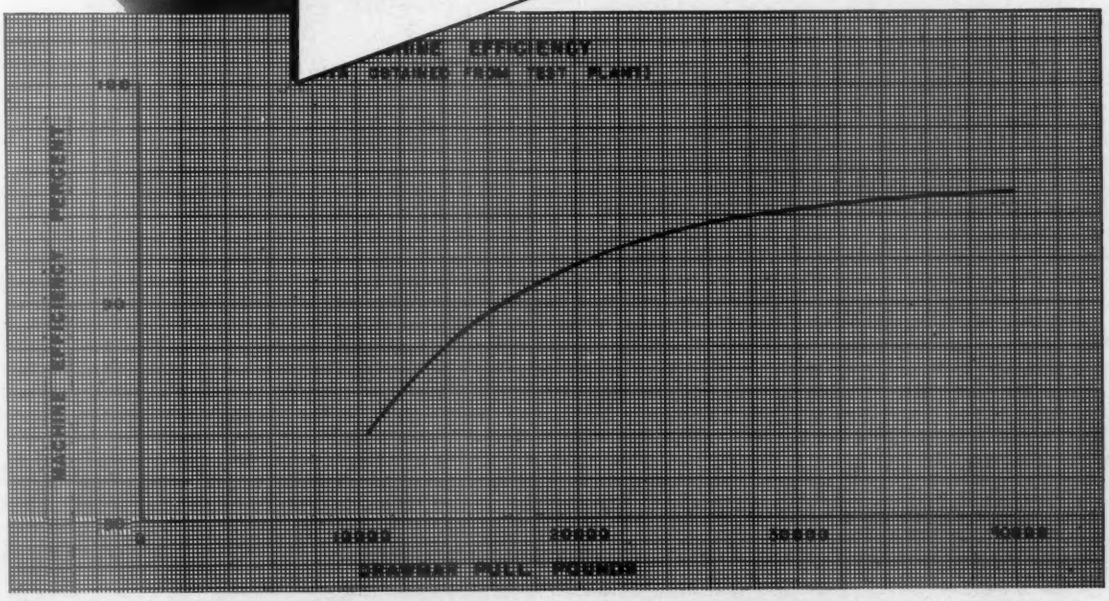
Machine Efficiency

FRANKLIN SYSTEM OF STEAM DISTRIBUTION



MACHINE EFFICIENCY (DATA OBTAINED FROM TEST PLANT)

The inherent advantages of the Franklin System of Steam Distribution over a conventional valve gear and piston type valve, permit a marked improvement in the machine efficiency of the locomotive. Outstanding features that contribute towards this are:

1. REDUCED FRICTION

(a) The short intermittent lift of the poppet valves, as contrasted with the travel of the piston valves, with their rings, drastically reduces the power required for valve operation.

(b) By driving direct from the crosshead and eliminating the conventional outside cranks and rods necessary in a piston valve arrangement, there is a further reduction in the power necessary to actuate the steam distribution system — at 500 r.p.m. the poppet valves and their driving mechanism require only 3.30 horsepower.

2. BETTER LUBRICATION

Piston valves require lubrication over the entire sliding surface. Poppet valves require lubrication on their valve stems only, which are not in direct contact with the steam. The mechanisms actuating the poppet valves (valve gear box and cam box) are fitted with anti-friction bearings and operate in a bath of oil.

3. LIGHTER IN WEIGHT

A twelve inch piston valve weighs approximately 132 lb. The weight of the multiple poppet valves to be moved at one time is approximately 13 lb.

FRANKLIN RAILWAY SUPPLY COMPANY, INC. NEW YORK CHICAGO MONTREAL

Among the Clubs and Associations

American Society of Mechanical Engineers

ELECTION OF OFFICERS

HAROLD V. COES, vice-president of Ford, Bacon & Davis, Inc., New York, has been elected president of the American Society of Mechanical Engineers for the year 1943. Vice-presidents elected to serve two-year terms on Council are Joseph W. Eshelman, president, Eshelman & Potter, Birmingham, Ala.; Thomas E. Purcell, general superintendent of power stations of the Duquesne Light Company, Pittsburgh, Pa.; Guy T. Shoemaker, vice-president, Kansas City Light & Power Company, Kansas City, Mo.; Walter J. Wohlenberg, professor of mechanical engineering, Yale University, New Haven, Conn.

Managers elected to serve on Council for three-year terms include Roscoe W. Morton, professor of mechanical engineering and head of the department, University of Tennessee, Knoxville, Tenn.; Alexander R. Stevenson, Jr., staff assistant to vice-president, General Electric Company, Schenectady, N. Y., and Albert E. White, director engineering research, University of Michigan, Ann Arbor, Mich.

The new officers will be installed during the sixty-third annual meeting of the society to be held in New York at the Hotel Astor, November 30 to December 4, 1942.

RAILROAD DIVISION

In accordance with usual procedure, the annual meeting of the Railroad Division of the A. S. M. E., scheduled for December 3, will be presided over by the present chairman, D. S. Ellis, chief mechanical officer, Chesapeake & Ohio. The position of chairman for the ensuing year will be filled by J. R. Jackson, engineer of tests, Missouri Pacific. At an all-committee meeting, held on June 9 in Cleveland, Ohio, W. C. Sanders, general manager, Railroad Division, Timken Roller Bearing Company, was elected incoming new member of the five-man Executive Committee.

By poll of the Executive, General and Advisory committees of the Railroad Division, the following three men have recently been elected incoming members of the General committee, each for a term of five years: J. M. Nicholson, mechanical assistant to vice-president, Atchison, Topeka & Santa Fe, Chicago; P. W. Kiefer, chief engineer motive power and rolling stock, New York Central, New York; and E. D. Campbell, general mechanical engineer, American Car and Foundry Company.

NORTHWEST LOCOMOTIVE ASSOCIATION.—Meeting October 19 at 8 p. m. at Woodruff Hall, St. Paul, Minn. Speaker: P. D. Blanchard, service engineer, The Superheater Company. Subject: The Production and Utilization of Superheated Steam.

NEW ENGLAND RAILROAD CLUB.—Meeting October 13 at the Hotel Touraine, Boston, Mass., starting with dinner at 6:30 p. m. Speaker: W. C. Kendall, chairman, Car Service Division, A. A. R. Subject: Handling of War-Time Traffic.

A. A. R. Mechanical Division Committee Changes

THE A. A. R., Mechanical Division, has announced the changes in the personnel of its committees as they have been effected to serve the division until June, 1943. There are no changes in the officers of the division, who are W. H. Flynn (chairman), general superintendent motive power and rolling stock, New York Central; R. G. Henley (vice-chairman), general superintendent motive power, Norfolk & Western; V. R. Hawthorne, executive vice-chairman; A. C. Browning, secretary, and W. I. Cantley, mechanical engineer. The following are the new members on each of the committees:

General Committee

H. W. Jones, chief motive power, Pennsylvania, Philadelphia, Pa. (succeeding F. W. Hankins, assistant vice-president, operations, Pennsylvania System, Philadelphia, Pa.)

J. M. Nicholson, assistant to vice-president, A. T. & S. F., Chicago (succeeding J. Purcell, assistant to the operating vice-president, A. T. & S. F.—retired.)

P. O. Christy, general superintendent equipment, Illinois Central, Chicago (succeeding G. C. Christy, general superintendent of equipment, Illinois Central—retired.)

H. P. Allstrand, chief mechanical officer, C. & N. W., Chicago (succeeding E. B. Hall, chief mechanical officer both of the C. & N. W. and the C. St. P. M. & O.—retired.)

B. M. Brown, general superintendent motive power, Southern Pacific, San Francisco, Calif. (succeeding George McCormick, general superintendent motive power, Southern Pacific—retired.)

A. K. Galloway, general superintendent motive power and equipment, B. & O., Baltimore, Md.

Nominating Committee

J. M. Nicholson, assistant to vice-president, A. T. & S. F., Chicago (succeeding J. Purcell.)

H. P. Allstrand, chief mechanical officer, C. & N. W., Chicago, (succeeding E. B. Hall.)

H. W. Jones, chief motive power, Pennsylvania, Philadelphia, Pa., (succeeding F. W. Hankins.)

Arbitration Committee

W. N. Messimer, assistant superintendent of equipment, New York Central, New York (succeeding W. H. Flynn.)

E. L. Bachman, general superintendent motive power, Pennsylvania, New York (succeeding W. R. Elsey, assistant to the vice president in charge of real estate, purchases and insurance, Pennsylvania, Philadelphia, Pa.)

Sub-Arbitration Committee

C. J. Hayes, supervisor of A. A. R. Billing Bureau, New York Central, Buffalo, N. Y. (succeeding W. N. Messimer.)

Prices for Labor and Materials

No changes.

Car Construction

R. B. Winship, mechanical engineer, Canadian Pacific, Montreal, Que. (succeeding W. A. Newman, chief mechanical engineer, Canadian Pacific, Montreal, Que.)

Brakes and Brake Equipment

F. T. McClure, supervisor air brakes, A. T. & S. F., Topeka, Kan. (succeeding J. A. Burke, supervisor air brakes, A. T. & S. F.—deceased—who has been succeeded as vice-chairman by J. P. Lantelme, general foreman, Pennsylvania, Philadelphia, Pa.)

A. J. Pichetto, general air brake engineer, Illinois Central, Chicago.

Couplers and Draft Gears

F. T. James, chief motive power, D. L. & W., Scranton, Pa. (succeeding E. E. Root, chief motive power, D. L. & W., who is now on a leave of absence.)

Loading Rules

G. D. Minter, division car inspector, N. & W., Portsmouth, Ohio (succeeding R. H. Dyer, general car inspector, N. & W., Roanoke, Va.)

Locomotive Construction

L. P. Michael, chief mechanical engineer, C. & N. W., Chicago (succeeding H. P. Allstrand, who has been succeeded as vice-chairman by E. L. Bachman, general superintendent motive power, Pennsylvania, New York.)

Safety Appliances

H. W. Jones, chief motive power, Pennsylvania, Philadelphia, Pa. (succeeding F. W. Hankins.)

J. M. Nicholson, assistant to vice-president, A. T. & S. F., Chicago (succeeding J. Purcell.)

Specifications for Materials

No changes.

Tank Cars

L. R. Schuster, engineer car construction, Southern Pacific, San Francisco, Calif. (succeeding, B. M. Brown, general superintendent motive power, Southern Pacific.)

D. S. Clark, administrative assistant, School of Mechanical Engineering, Purdue University, Lafayette, Ind. (succeeding G. A. Young, School of Mechanical Engineering, Purdue University.)

G. W. Thomas, master car builder, Deep Rock Oil Corp., Cushing, Okla. (succeeding W. C. Steffa, transportation manager, Sinclair Refining Company, New York.)

Wheels

F. Holsinger, wheel shop foreman, Marckham shop, Illinois Central, Hazelcrest, Ill.

Lubrication of Cars and Locomotives

No changes.

Further Development of Reciprocating Steam Locomotive

A. J. Townsend, mechanical engineer, Lima Locomotive Works, Inc., Lima, Ohio (succeeding W. E. Woodard, vice-president, Lima Locomotive Works—deceased.)

R. P. Johnson, chief engineer, Locomotive Division, Baldwin Locomotive Works, Philadelphia, Pa. (succeeding W. H. Winterrowd, vice-president, Baldwin Locomotive Works—deceased.)

J. E. Davenport, vice-president, engineering, American Locomotive Company, New York (succeeding J. B. Ennis, senior vice-president, American Locomotive Company.)

Joint Committee on Utilization of Locomotives

No changes.

Journal Bearing Development (New Committee)

W. I. Cantley (chairman), mechanical engineer, Association of American Railroads, Chicago.

J. R. Jackson, engineer of tests, Missouri Pacific, St. Louis, Mo.

J. W. Hergenhan, assistant engineer, test department, New York Central, New York.

J. Mattise, general air brake instructor, C. & N. W., Chicago.

L. B. Jones, engineer of tests, Pennsylvania, Altoona, Pa.

C. B. Bryant, engineer of tests, Southern, Alexandria, Va.

Committee on Geared Handbrakes (New Committee)

R. G. Henley (chairman), general superintendent motive power, N. & W., Roanoke, Va.

E. P. Moses, engineer rolling stock, New York Central, New York.

J. P. Lantelme, general foreman, Pennsylvania, Philadelphia, Pa.

W. I. Cantley, mechanical engineer, Association of American Railroads, Chicago.

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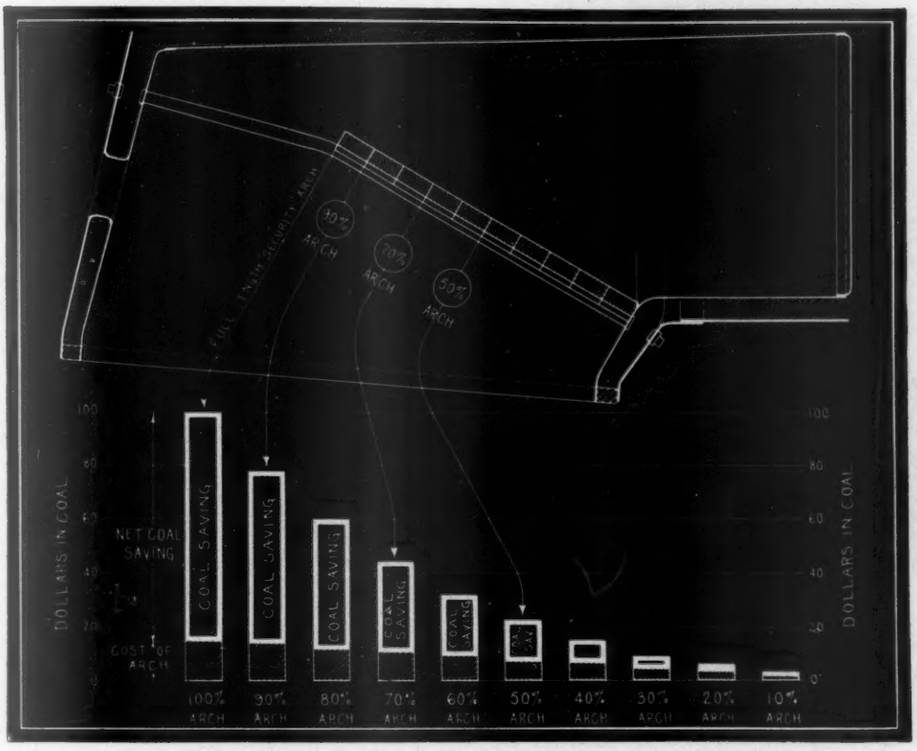

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LET THE ARCH HELP YOU SAVE

With the emphasis being placed on saving every railroad dollar, the locomotive Arch becomes increasingly important.

Regardless of the amount of tonnage handled, the locomotive Arch saves enough fuel to pay for itself ten times over.

Be sure that every locomotive leaving the roundhouse has its Arch complete with not a single brick nor a single course missing.

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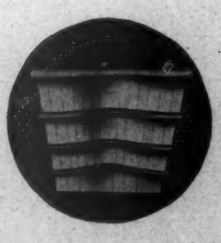

AMERICAN ARCH CO.
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60 EAST 42nd STREET, NEW YORK, N. Y.
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NEWS

B & O.'s new No. 1 goes into regular freight service

B. & O. Operates First Diesel Freight Locomotive in East

THE first Diesel-electric freight locomotive to be operated on an Eastern railroad was placed in service by the Baltimore & Ohio at Chicago on August 31. The 5,400-hp. locomotive was delivered by the Electro-Motive Division of General Motors Corporation a week previously and had been tested on the Chicago-Akron division. It left the Barr yards at Chicago on August 31, with a train of 76 loaded oil cars and a dynamometer car for an 805-mile non-stop run to Baltimore, Md.

ODT Appointment

CHARLES J. WOLFE, superintendent of motive power of the Western Maryland, has been appointed associate director of the Office of Defense Transportation's Division of Railway Transport, in charge of the Mechanical Section.

Lima Extends Its Tank Plant

LIMA Locomotive Works, Inc., is completing the equipment of an extension to its tank arsenal at Lima, Ohio, which will be in production well before the end of the year. The expansion will represent an increase of 80 per cent in the size of the tank plant. When it is in full production, the company will be producing five times as many tanks as were contemplated when the original tank plant was built in 1941.

Lima's tank arsenal built the first of the M-4 type tanks. This was christened at the Lima plant on January 27, 1942. It is of cast-steel and welded construction, and numbers like it which have since been turned out from this plant have already been subjected to the test of actual combat. The Lima tank arsenal is entirely separate from the locomotive plant which is also engaged in the manufacture of cranes, power shovels, and drag lines, as well as machine-tool parts and parts of other war equipment on a sub-contracting basis. The plant is now engaged 100 per cent in war work.

Conservation of Rubber In Air-Brake Hose

ON page 312 of the July, 1942, *Railway Mechanical Engineer* are reproduced instructions issued by the A. A. R. Mechanical Division for reclaiming air-brake hose by splicing. The drawing which accompanies this article illustrates a malleable-iron joiner to be used in splicing the air-brake hose.

A case has been reported in which some car owner is using shop-made joiners made from pipe stock which do not meet the requirements and which allow the hose to move on the fitting. The Mechanical Division states that this practice cannot be tolerated, as it will result in spliced hose pulling off the fitting and delaying trains and much needed equipment. It is urged that for the purpose of splicing air-brake hose, all car owners and repairing lines use malleable-iron joiners meeting fully all of the dimensional requirements shown on the drawing referred to.

Pelley Sees Shortage of Engines

TESTIFYING before a special unofficial House committee investigating the petroleum situation on the east coast on August 31, J. J. Pelley, president of the Association of American Railroads, declared that the railroads would be doing well if they can maintain a daily movement of 800,000 barrels of oil to the east during the coming fall and winter months. He went on to explain to the committee that the bottleneck, if any, will come in a lack of locomotives rather than in the ability to obtain the necessary tank cars. He pointed out that because of the shortage of steel and other materials, the railroads would come up to the end of this year with 400 to 500 fewer locomotives than they had on order.

New Programs Said to Call for 900 Locomotives, 80,000 Cars

A PROPOSED program calling for the construction of 80,000 additional freight cars and 900 locomotives needed to handle the increased volume of traffic anticipated next year is reported to be in the hands of the War Production Board. The program is reportedly based on estimates that ton-miles in 1943 will increase 15 per cent over 1942 and that active cars will increase with a rise in ton-miles in the ratio of 1 to 3. To effect a net increase of 80,000 cars, the program should include an additional number to compensate for cars to be retired during the period, but, recognizing the critical-materials situation, it is reported to have been held to 80,000.

Of these, 3,500 will be box cars and 76,500 open-top cars. The latter include 10,000 flat cars, 2,000 covered hopper cars, 25,000 hopper cars, 35,000 gondola cars and 4,500 ore cars.

(*Continued on next left-hand page*)

Orders and Inquiries for New Equipment Placed Since the Closing of the August Issue

LOCOMOTIVE ORDERS

Road	No. of Locos.	Type of Locos.	Builder
Lehigh Valley	5	1,000-hp. Diesel-elec.	Electro-Motive Corp.
	5	1,000-hp. Diesel-elec.	American Loco. Co.
Norfolk & Western	5[1]	2-6-6-4	Company Shops

LOCOMOTIVE INQUIRIES

New York Central	25	4-8-2	.....

FREIGHT-CAR ORDERS

Road	No. of Cars	Type of Car	Builder
Carnegie-Illinois Steel Corp.	80	100-ton gondola	American Car & Fdry. Co.
Denver & Rio Grande Western	780[2]	Gondola	Pressed Steel Car Co.
Dow Chemical Company	2[2]	Tank	American Car & Fdry. Co.
General Electric Co.	1[2]	Hopper	American Car & Fdry. Co.
Missouri Pacific	50[2]	Hopper	American Car & Fdry. Co.
Union Pacific	1,000[2]	Gondola	Pull-Std. Car Mfg. Co.

FREIGHT-CAR INQUIRIES

Carnegie-Illinois Steel Corp.	18	70-ton gondolas	.....
	10	50-ton flat	.....
Colorado Fuel & Iron Corp.	30	75-ton ore	.....
Norfolk & Western	100[3]	70-ton gondola	.....
	25[3]	70-ton flat	.....
Republic Steel Corp.	20-125	70-ton hopper	.....

[1] Authorization received from the War Production Board, provided necessary materials can be secured as required, the N. & W. expects to complete two in January, one in February and two in March.
[2] Release issued by the War Production Board.
[3] Subject to approval of the War Production Board.

This new equipment-building program for the railroads is reported to cover the year October, 1942-43, although, at the current lagging rate of operation in the car-building industry, it is doubtful that the 1942 program will be completed by October 1. If the views of some railroad officers prevail, who believe that employment in the car-building industry should be made continuous, and production schedules placed on a monthly basis, the new program will get under way as quickly as possible. The industry is known to be concerned over the dispersal of its workers.

Railroads Get 16,024 of Final 18,000 Freight Cars

FINAL allocation of the 18,000 cars authorized by the War Production Board to complete the 1942 car-building program shows 16,024 of the cars were released to railroads and 1,976 to private car lines. Of the total, 11,676 will be built by contract car builders and 6,324 in railroad company shops.

As of September 1, there were 14,275 cars authorized for 1942 construction yet to be delivered, including 965 remaining of the original 36,000 authorized by the former Supply, Priorities and Allocations Board and 13,310 remaining of the additional 18,000 authorized by the WPB. Of the 965 left in the SPAB program, 601 (260 gondola, 89 hopper and 252 tank cars) are on order with contract car builders and 364 hopper cars with railroad company shops, while the 13,310 left in the WPB program include 9,985 on order with contract car builders and 3,325 with railroad company shops. Deliveries under the programs are reported to be lagging seriously, especially in car building plants, due to continued materials' shortages.

The allocation of the cars by railroads and builders is shown in the accompanying table.

Allocation of Final 18,000 Freight Cars Authorized by WPB to Complete 1942 Construction

Name of Railroad	No.	Type	Builder
Atlantic Coast Line	172	Flat	Greenville Steel Car
	300*	Gondola	Bethlehem Steel Co.
Bessemer & Lake Erie	150	Gondola	Greenville Steel Car
	20	Gondola	Pressed Steel
	93	Hopper	Pullman-Standard
Birmingham Southern	86	Gondola	Pullman-Standard
Central of New Jersey	500*	Gondola	Bethlehem Steel Co.
	246	Hopper	Company Shops
	50	Cov. Hopper	American Car & Foundry
Chesapeake & Ohio	130	Hopper	American Car & Foundry
Chicago & North Western	25	Flat	Company Shops
	250	Flat	Pullman-Standard
Chicago, Burlington & Quincy	400	Flat	Company Shops
	500*	Hopper	Company Shops
	50	Cov. Hopper	Company Shops
Chicago, Milwaukee, St. Paul & Pacific	2	Flat	Company Shops
Chicago, Rock Island & Pacific	300	Flat	Company Shops
Delaware & Hudson	80	Hopper	Company Shops
Denver & Rio Grande Western	780	Gondola	Pressed Steel
Detroit, Toledo & Ironton	50	Flat	Greenville Steel Car
Duluth, Missabe & Iron Range	500	Ore	Pullman-Standard
	500	Ore	General American
	500	Ore	American Car & Foundry
Elgin, Joliet & Eastern	200	Flat	Ralston
	500*	Gondola	American Car & Foundry
	200	Gondola	General American
Great Northern	500	Ore	Bethlehem Steel Co.
Lehigh Valley	960*	Hopper	Bethlehem Steel Co.
Louisville & Nashville	100	Flat	Mount Vernon Car
	100	Cov. Hopper	American Car & Foundry
Missouri Pacific	570	Gondola	Pressed Steel
	100	Cov. Hopper	American Car & Foundry
Nashville, Chattanooga & St. Louis.	50	Cov. Hopper	American Car & Foundry
New York Central	303	Flat	Despatch Shops
	1,100*	Gondola	Despatch Shops
New York, Chicago & St. Louis	50	Flat	Pullman-Standard
	50	Cov. Hopper	American Car & Foundry
New York, New Haven & Hartford	13	Flat	Company Shops
Norfolk & Western	200	Hopper	Virginia Bridge
Northern Pacific	489	Hopper	American Car & Foundry
Pennsylvania	22	Flat	Company Shops
	1,000	Gondola	Company Shops
	797	Hopper	Company Shops
Pere Marquette	250	Flat	Greenville
Reading	300	Gondola	Company Shops
	300	Hopper	Company Shops
St. Louis Southwestern	50	Flat	Company Shops
Southern Pacific	10	Flat	Company Shops
	90	Gondola	Company Shops
Union Pacific	1,000*	Gondola	Pullman-Standard
Virginian	100	Gondola	Company Shops
	536	Hopper	Company Shops
Wabash	100	Gondola	Company Shops
Western Pacific	300	Flat	Mount Vernon Car
Shippers Car Line	3	Flat	American Car & Foundry
	22	Cov. Hopper	American Car & Foundry
	786	Tank	American Car & Foundry
Various Other Private Car Lines..	1	Cov. Hopper	American Car & Foundry
	605	Tank	American Car & Foundry
	559	Tank	General American
Total	18,000		

* Composite wood and steel construction.

Supply Trade Notes

WILLIAM N. MANUEL, manager of the general sales service department of the Corning Glass Works, Corning, N. Y., retired on September 1, after 25 years of service with that company.

◆

ALLEGHENY-LUDLUM STEEL CORPORATION.—*W. G. McFadden* has been appointed acting manager of the Chicago office of the Allegheny-Ludlum Steel Corporation to replace *P. E. Floyd*, now serving with the government.

◆

WILLIAM E. VOGT has been elected secretary of Electro Metallurgical Sales Corporation, a unit of the Union Carbide & Carbon Corporation, with headquarters in the company's New York offices. Mr. Vogt has been with units of the Union Carbide & Carbon Corporation for more than 30 years.

Army-Navy Production Awards

Recognition of high achievement in the production of war equipment has been made by the presentation of the Army-Navy "E" to the following companies:

The Armstrong Bros. Tool Company, Chicago. September 15.

The International Nickel Company, Huntington, W. Va. All-Navy "E"—awarded for second time.

Jones & Lamson Machine Co., Inc., Springfield, Vt. August 24.

Ohio Injector Company, Wadsworth, Ohio. August 26.

Pressed Steel Car Co., Inc., Hegewisch, Ill. September 9.

William Sellers and Company, Philadelphia, Pa. September 11.

Vermont Foundries, Inc., Springfield, Vt. August 24.

CHARLES H. MCCREA, first vice-president, of the National Malleable & Steel Castings Company, has been elected president, succeeding Carl C. Gibbs, deceased.

◆

LANDIS MACHINE COMPANY.—*G. N. Kirkpatrick*, vice president and general manager of the Landis Machine Company, Waynesboro, Pa., has been appointed president. Mr. Kirkpatrick will continue also as general manager. *G. M. Stickell*, sales manager has been appointed vice president and will continue also as sales manager.

◆

JOHN F. VAN NORT, sales manager, Western division of the Duff-Norton Manufacturing Company, Pittsburgh, Pa., with headquarters at Chicago, has been promoted to general sales manager at Pittsburgh. Mr. Van Nort was born at

(*Continued on next left-hand page*)

FOR VICTORY TODAY AND SOUND BUSINESS TOMORROW

Get This Flag Flying Now!

This War Savings Flag which flies today over companies, large and small, all across the land means *business.* It means, first, that 10% of the company's gross pay roll is being invested in War Bonds by the workers voluntarily.

It also means that the employees of all these companies are doing their part for Victory . . . by helping to buy the guns, tanks, and planes that America and her allies *must* have to win.

It means that billions of dollars are being diverted from "bidding" for the constantly shrinking stock of goods available, thus putting a brake on inflation. And it means that billions of dollars will be held in readiness for post-war readjustment.

Think what 10% of the national income, saved in War Bonds now, month after month, can buy when the war ends!

For Victory today . . . and prosperity *tomorrow,* keep the War Bond Pay-roll Savings Plan rolling in *your* firm. Get that flag flying now! Your State War Savings Staff Administrator will gladly explain how you may do so.

If your firm has not already installed the Pay-roll Savings Plan, *now is the time to do so.* For full details, plus samples of result-getting literature and promotional helps, write or wire: War Savings Staff, Section F, Treasury Department, 709 Twelfth Street NW., Washington, D. C.

Save With

War Savings Bonds

This Space Is a Contribution to America's All-Out War Program by

RAILWAY MECHANICAL ENGINEER

Fairmont, W. Va., on July 27, 1898, and began his business career in 1922 as a salesman with the Oil Well Supply Company (a subsidiary of the United States Steel Corporation) at Pittsburgh, Pa. He later served in various capacities in the sales department of that company, including those of branch store manager and

John F. Van Nort

special representative of the Eastern division. In 1934 Mr. Van Nort became manager of Pittsburgh sales, with headquarters at Pittsburgh, which position he held until 1941, when he resigned to become Western division sales manager of Duff-Norton.

Obituary

EARL HAMMOND FISHER, assistant to the president of the Wine Railway Appliance Company and assistant to the vice-president of the Unitcast Corporation, Toledo, Ohio, who died on August 9, as reported in the September issue, began his career with the Norfolk & Western at Roanoke, Va. He served as chief clerk to master boilermaker from March, 1914, to July, 1915, and as a draftsman, motive power, from July, 1915, to July, 1916. He subsequently was engaged as a draftsman for the Colorado & Southern at Denver, Colo., from July to September, 1916; as a draftsman for the Chicago, Rock Island & Pacific at Silvis, Ill., from September, 1916, to July, 1917, to December, 1918, and as a locomo- Union Pacific at Omaha, Nebr., from July, 1917, to December, 1918. and as a locomotive designer for the Norfolk & Western from December, 1918, to March, 1921. He was associated with the Hanna Locomotive Stoker Company, Cincinnati, Ohio, as mechanical engineer from March, 1921, to February, 1923, and with the T. H. Symington Company, East Rochester, N. Y., as special designer from February to April, 1923. He joined the Wine Railway Appliance Company in April, 1923, as mechanical engineer; in January, 1926, was appointed sales engineer and in July, 1939, became assistant to the president, Wine Railway Appliance Company, and assistant to the vice-president, Unitcast Corporation.

◆

HARRY T. THOMPSON, district manager of the Metal & Thermit Corp., died on August 19. He was 53 years of age. Mr. Thompson was a graduate of the Georgia Institute of Technology (1912). During World War I he served in France as a captain in the field artillery. After returning to civilian life, he became associated with the Differential Steel Car Company, Findlay, Ohio, and later became a vice-president and director of the company, continuing in these positions until his death. He joined the sales organization of the Metal & Thermit Corporation in 1931. Shortly thereafter, he was appointed district manager and placed in charge of the company's Pittsburgh, Pa., branch, which serves the central Atlantic and southeastern states.

◆

HENRY ETTER PASSMORE, railway supply representative at Pittsburgh, Pa., died July 5. Mr. Passmore was 72 years of age. He was educated at the York (Pa.) Collegiate Institute and the Maryland Institute. He entered railway service in 1886 as a machinist apprentice of the Northern Central at Baltimore, Md. At the completion of his apprenticeship, he continued as a machinist on the Northern Central for a year and then entered the employ of the Norfolk & Western as a machinist, subsequently becoming gang foreman and division shop foreman. He was track foreman of the Baldwin Locomotive Works from 1896 to 1898; general foreman of the Philadelphia & Reading, 1898-99; assistant master mechanic of the Western Maryland, 1899 to October, 1902, and superintendent motive power and equipment, Detroit Southern, 1902 to April, 1903. He was appointed master mechanic of the Toledo & Ohio Central in 1903, and in October, 1913, entered the sales department of the Grip Nut Company. He went to Pittsburgh as sales manager of the Davis Brake Beam Company in August, 1925. At the time of his death he was railway supply representative of the Frost Railway Supply Company, the Koppers Company—American Hammered Piston Ring division, and the Slaymaker Lock Company.

◆

CARL C. GIBBS, president of the National Malleable & Steel Castings Company, died suddenly at his home in Shaker Heights, Ohio, on September 9. Mr. Gibbs was born in Rush county, Ind., on October 10, 1882. He received a high school and commercial college education and began his

Carl C. Gibbs

career with the National Malleable & Steel Castings Company as secretary to the sales manager of the Indianapolis, Ind., works in 1906. From 1910 to 1919, he was a salesman at the Indianapolis plant, and in 1919 became sales manager of the company's Cleveland, Ohio, works. He returned to Indianapolis in the following year as manager of that plant, and in 1929 was appointed assistant to the president. In 1934 he was elected president. At the time of his death, Mr. Gibbs was a director of the Railway Business Association, having been elected a member of the governing board in November, 1935.

Personal Mention

General

E. L. COOK, assistant mechanical engineer of the Seaboard Air Line at Norfolk, Va., has been appointed mechanical engineer, with headquarters at Norfolk.

F. L. KARTHEISER, chief clerk, mechanical department, of the Chicago, Burlington & Quincy, has been appointed to fill the newly created position of assistant to vice-president (operation), at Chicago. Mr. Kartheiser is secretary-treasurer of the Car Department Officers' Association.

FRANK E. RUSSELL, JR., assistant superintendent of motive power of the Southern Pacific at Los Angeles, Calif., has been called to military service as a lieutenant colonel in the U. S. Army.

M. WILKINSON, supervisor maintenance of equipment of the Texas & Pacific at Dallas, Tex., has been appointed mechanical inspector, with headquarters at Dallas.

L. A. PORTER, mechanical engineer of the Seaboard Air Line at Norfolk, Va., has been appointed assistant to general superintendent motive power, with headquarters at Norfolk.

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F. R. HOSAK, mechanical superintendent of the Missouri Pacific at St. Louis, Mo., has been called to military service.

G. O. WILLHIDE, master mechanic of the Western Maryland at Hagerstown, Md., has been appointed acting superintendent motive power, with headquarters as before at Hagerstown.

MILTON C. PRENTISS, who was appointed engineer of motive power of the New York, Ontario & Western with headquarters at Middletown, N. Y., as announced

Milton C. Prentiss

in the September issue of the *Railway Mechanical Engineer*, was born on May 27, 1900, at Greenville, Me. Mr. Prentiss received his bachelor of science degree in mechanical engineering from the University of Maine in 1923 and entered railroad service on September 21, 1924, with the New York, New Haven & Hartford, serving as special apprentice and mechanical inspector at the Readville locomotive shops. He then became enginehouse foreman and traveling locomotive inspector, successively, for the Boston & Maine, leaving that road to go with the planning department, Railway division, Edward G. Budd Manufacturing Company. Mr. Prentiss then went with the Baldwin Locomotive Works in the materials department, subsequently becoming factory engineer for the Philco Radio & Television Company. Mr. Prentiss then became sales engineer for the Gulf Oil Corporation.

F. H. COWAN has been appointed supervisor maintenance of equipment of the Texas & Pacific, with headquarters at Dallas, Tex.

G. T. CALLENDER, superintendent of shops of the Missouri Pacific at Sedalia, Mo., has been appointed acting mechanical superintendent, Western district, with headquarters at St. Louis, Mo.

H. T. COVER, superintendent of freight transportation, Eastern region, of the Pennsylvania, has been appointed general superintendent of the Eastern Ohio division, with headquarters at Pittsburgh, Pa. A photograph and detailed sketch of Mr. Cover's career appeared on page 89 of the February *Railway Mechanical Engineer* at the time he became superintendent of freight transportation. Mr. Cover entered the service of the Pennsylvania first as a laborer and then as a boilermaker's helper. After successive promotions in the mechanical department to the position of master mechanic of the Columbus, Cincinnati, and Toledo divisions, he became superintendent of the Wilkes-Barre division at Sunbury, Pa., and then superintendent of freight transportation at Philadelphia.

RAY L. REX, who has been appointed mechanical assistant of the New York, Ontario & Western at Middletown, N. Y., as announced in the September *Railway Mechanical Engineer*, was born on May 2, 1901, at Lehighton, Pa. Mr. Rex served with the A. E. F. in France in 1918 and in 1919 went with the New Jersey Zinc Company Laboratory. He entered railway service on June 1, 1920, with the Lehigh Valley as a boilermaker helper at the Lehighton enginehouse, becoming a machinist apprentice in September, 1920. In September, 1924, Mr. Rex became machinist, then serving successively as time study engineer and piece-rate setter, dumper-plant engineer at Perth Amboy, N. J., chief engineer, and plant engineer and general foreman of locomotive and car shops at Perth Amboy.

Ray L. Rex

Master Mechanics and Road Foremen

G. E. JOHNSON, master mechanic of the Chicago, Burlington & Quincy at Havelock, Neb., has retired.

B. O'DONNELL, shop superintendent of the New York, Chicago & St. Louis at Lima, Ohio, has become assistant master mechanic, with headquarters at Lima.

G. A. MCLAIN, fireman of the New York, Chicago & St. Louis at Frankfort, Ind., has been appointed assistant road foreman of engines, of the Clover Leaf district.

O. M. HOENSHELL, road foreman of locomotives of the Chicago, Burlington & Quincy at Lincoln, Neb., has been appointed assistant master mechanic, with jurisdiction over the Omaha division. Mr. Hoenshell's headquarters are at Havelock, Neb.

A. R. NELSON, superintendent of shops of the Union Pacific at Pocatello, Idaho, is now master mechanic at Pocatello.

J. M. KLINE, special duty engineman on the Logansport division of the Pennsylvania, has been appointed assistant road foreman of engines, Cleveland division.

H. M. JOHNSON, engineer of the Toledo division of the New York, Chicago & St. Louis, has been appointed road foreman of engines, Clover Leaf district.

C. W. WHISLER, assistant general foreman of the Altoona (Pa.) car shops of the Pennsylvania, has become master mechanic of the Philadelphia terminal division.

E. O. SIEWEKE, assistant train master-assistant road foreman of engines, Cincinnati division of the Pennsylvania, with headquarters at Richmond, Ind., has retired.

C. T. HUNT, master mechanic of the Philadelphia terminal division of the Pennsylvania, has been transferred to the position of master mechanic, Philadelphia division.

GOMER D. JONES has been appointed to fill the newly created position of master mechanic of the Southern Kansas division of the Atchison, Topeka & Santa Fe, with headquarters at Chanute, Kan.

H. A. PATTERSON, assistant road foreman of engines, Cleveland division of the Pennsylvania, has been appointed assistant train master-assistant road foreman of engines, Cincinnati division, with headquarters at Richmond, Ind.

Car Department

S. M. EHRMAN has been appointed car lubrication inspector of the Chesapeake & Ohio, with headquarters at Russell, Ky.

A. B. WELCH, supervisor maintenance of equipment of the Texas & Pacific, with headquarters at Dallas, Tex., has been appointed car foreman of the Longview, Tex., shops.

Shop and Enginehouse

F. W. YOUNG, general foreman of the Dominion Atlantic Railway at Kentville, N. S., has retired.

J. D. MORRISON, locomotive foreman of the Canadian Pacific at Sherbrooke, Quebec, has been appointed general foreman of the Dominion Atlantic Railway, with headquarters at Kentville, N. S.

S. O. RENTSCHLER, general foreman of the locomotive department of the Missouri Pacific at Sedalia, Mo., has been appointed superintendent of shops, with headquarters at Sedalia, Mo.

SAMUEL CORNELL SNOW, machinist of the Louisville & Nashville at South Louisville, Ky., has been appointed night foreman of the Diesel road locomotive shop at

(*Continued on next left-hand page*)

OURS...and YOURS

WE INVITE you, Mr. and Mrs. America,
to share the honor of the Army-Navy Production Award
with the thousands of our loyal, skillful men
and women working on war orders in the office...
in the plant...and in the field.

SHARE IT with these workers...
you government officials who worked with them
closely, and with whole-hearted cooperation.

SHARE IT with them...you stockholders
who supported the early conversion of our plants
to war work, and approved our first efforts
to help our government.

SHARE IT with them...you men, women and children
who turned in sweat-stained bills...
checks that scraped the bottom of the bank account
...pennies from piggy-banks
...for Victory Bonds and Stamps.

ALL OF YOU gave your time, and effort, and money.

NOW, our government says that we spent well...
creating a tremendous volume
of the arms America urgently must have to win this war.

OUR HONOR is also your honor.
And this flag is also your flag.

UNDER IT, with your help, we intend to fight
the battle of production with still greater energy.

WE RATE it higher, and we'll fly it higher,
than any other flag in the U. S....
...except one.

AMERICAN LOCOMOTIVE

A NATIONAL ARSENAL OF MOBILE POWER

TANKS • GUN CARRIAGES • ARMY AND NAVY ORDNANCE • STEAM AND DIESEL LOCOMOTIVES

South Louisville. It was erroneously reported in the August issue that Mr. Snow had become foreman of the Diesel road locomotive shop.

ROBERT L. MORRIS, electrical-mechanical foreman of the Louisville & Nashville at Radnor, Tenn., has become foreman of the Diesel road locomotive shop at South Louisville, Ky. It was erroneously reported in the August issue that Mr. Morris had become night foreman of the Diesel road locomotive shop at South Louisville, Ky.

HOWARD CHARLES VINSANT, master mechanic of the Texas & Pacific at Marshall, Tex., who has been appointed shop superintendent at Ft. Worth, Tex., as noted in the July *Railway Mechanical Engineer*, was born on June 22, 1900, at Ft. Worth. After graduating from high school, Mr. Vinsant entered the service of the Texas & Pacific in August, 1917, as a machinist ap-

H. C. Vinsant

prentice. On February 22, 1923, he became a machinist; on September 1, 1924, lead machinist; on April 1, 1928, assistant enginehouse foreman, and on June 22, 1929, enginehouse foreman at Mineola, Tex. He was transferred to the position of enginehouse foreman at Big Spring, Tex., on April 1, 1930, and on April 19, 1931, became general foreman of the Lancaster shops at Ft. Worth. He was appointed assistant master mechanic at the Lancaster shops on April 15, 1932; division general foreman, Rio Grande division, with headquarters at Big Spring, on December 17, 1933; master mechanic, Ft. Worth division, with headquarters at Ft. Worth, on May 29, 1934; master mechanic, Eastern division, with headquarters at Marshall, Tex., on August 1, 1940, and shop superintendent at Ft. Worth on June 1, 1942.

L. E. SCHUETTE, car foreman of the Mahoning division of the Erie, at Brier Hill, Ohio, who has been appointed shop superintendent at Susquehanna, Pa., as announced in the September issue, was born on April 19, 1898, at Kent, Ohio. Mr. Schuette was graduated from Kent high school in 1917 and on November 27, 1917, entered the service of the Erie as a car repairer at the Kent car shops. On December 1 of the same year he became piecework checker and on March 1, 1918, assistant foreman, steel yards, Kent car shops. He entered military service on November 20, 1918, and on September 15, 1919, returned to the Erie as car repairer. From November 1, 1922, to November 16, 1927, he was employed as an A. R. A. writer at Kent, at which time he became foreman of the upholstery department. On

L. E. Schuette

February 16, 1930, he was promoted to the position of assistant to the division car foreman at Marion, Ohio. On June 4, 1934, he became outside inspector for the Pullman Car and Manufacturing Company at Chicago. He returned to Marion, Ohio, on August 30, 1934, as assistant to division car foreman, and on October 1, 1934, became car foreman of the Ferrona car shops, at Sharon, Pa., and on October 1, 1940, division car foreman of the Mahoning division, with headquarters at Youngstown, Ohio.

Purchasing and Stores

CLIFFORD THORBURN, assistant purchasing agent of the Southern Pacific, with headquarters at Portland, Ore., has been appointed purchasing agent at Portland.

M. C. NYSTROM, assistant purchasing agent of the Southern Pacific at San Francisco, Calif., has been appointed assistant general purchasing agent at San Francisco.

E. H. POLK, assistant purchasing agent of the Southern Pacific, with headquarters at Los Angeles, Calif., has been appointed purchasing agent at Los Angeles.

E. J. BECKER, assistant purchasing agent of the Southern Pacific, with headquarters at San Francisco, Calif., has become assistant general purchasing agent at San Francisco.

N. L. SATCHELL, storekeeper of the New York, Susquehanna & Western at Middletown, N. Y., has been appointed purchasing agent, with headquarters at Paterson, N. J.

C. E. WATSON, chief clerk in the general store department of the St. Louis Southwestern at Pine Bluff, Ark., has been promoted to the newly created position of assistant general storekeeper, with the same headquarters.

Trade Publications

Copies of trade publications described in the column can be obtained by writing to the manufacturers, preferably on company letterhead, giving title. State the name and number of the bulletin or catalog desired, when it is mentioned.

CLEANING AND DESCALING MANUAL.—Oakite Products, Oakite Railway Service Division, Room 1001, Wrigley building, Chicago. A 24-page manual discussing Oakite Compound No. 32 for the removal of hard-water scales, rust and similar deposits from equipment, parts, and other metallic surfaces, including cooling systems of Diesel-electric locomotives.

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"MILLING MACHINE PRACTICE."—Cincinnati Milling and Grinding Machines, Inc., Cincinnati, Ohio. Revised edition. Booklet No. M-773-1; illustrated. Contains chapters on Analysis of the Process of Milling, Milling Cutters, Use of Milling Cutters, and Milling Machines, as well as additional information on the machining of magnesium and characteristic types of milling machines and attachments.

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WELDING EQUIPMENT FOR RAILROAD SERVICE.—Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Bulletin B-3050. Describes and illustrates welding equipment for all five types of railroad service—maintenance of way, shop maintenance, roundhouse maintenance, car building, and general repairs, maintenance and construction. Equipment includes Flexarc d.c. and a.c. welders, engine-driven welders, equipment for semi-automatic process welding, electrodes, and accessories.

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LATHES.—South Bend Lathe Works, Dept. Rs, South Bend, Ind. *Bulletin H-1, "Keep Your Lathe Clean."* Sixteen pages. The first of a series on How To Get the Most Out of Your Lathes. Shows how keeping lathes clean will help increase production, reduce scrap, and lengthen life of the lathe. Catalog 100B—*"South Bend Lathes";* 48 pages, illustrated. Contains sections on toolroom lathes, quick change gear lathes; plain change gear lathes; turret lathes, and attachments, features, and specifications.

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"SPECIAL STEELS—THEIR PROPERTIES AND USES."—Allegheny Ludlum Steel Corporation, Pittsburgh, Pa. Revised edition of Handbook of Special Steels. One hundred twenty-eight pages, spiral bound. Designed to be helpful in the selection of proper types of tool, stainless, electrical, and carbon steels in the various forms produced by Allegheny Ludlum. Contains also a table of recommended types for particular applications; drill rod information; a Special Products section on shoe die steel, silcrome valve steels, and special shapes; engineering tables, etc.